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THE HIGHWAY CONTRACTOR AND ROAD BUILDER

54
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GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, JULY 6, 1918

Number
1

Highway Work in Connecticut*

Construction and Maintenance Work in 1917 Reviewed and Road Problems Discussed in the Annual Report of the State Highway Commissioner

The total gross expenditures of the department for the term covered by this report are \$2,528,225.49 * * * The refunds received from all sources, including towns, counties, railway companies, etc., are \$330,961.75, making a total net expenditure for the year of \$2,197,263.74, which is slightly in excess of the sum spent during the season of 1915-16. This increase is due mainly to the increase in the cost of maintenance and reconstruction of highways and was made possible by the increased revenue from the automobile funds and necessary by the increased cost of material and labor due to war conditions. The figure thus given is not, however, an actual statement of funds expended by the state, since payments have been made on contracts in force and not completed from which money will be returned to the state on the completion of the contracts. Consequently the total amount expended by the state during the year can only be approximated, but is close to \$2,000,000.

The chief expenditures of the department are divided into three parts as previously stated: First, the construction of highways; second, the construction of trunk line bridges under provisions of the Public Acts of 1915 and 1917; and

third, payments for the maintenance, reconstruction and repair of highways. Other appropriations are made for specific purposes, such as elimination of dangerous conditions on trunk lines, construction of specified bridges and for the general operation of the department.

The expenditures for the maintenance, reconstruction and repair of highways are subdivided into two parts, namely, (a) expenditures for the ordinary maintenance and oiling of roads, the cleaning and opening of sluices and water courses; and (b) expenditures for replacements or reconstruction of existing roads. This latter item may be classed as permanent improvement work done from the Repair Funds Account. * * *

During the past year the work of road construction has been restricted because the Legislature of 1915 did not make appropriations for new road construction. The Legislature of 1917, however, made ample provisions for new construction work. Consequently, the coming two years should show an increase in the mileage of improved highways, though this amount of work will of necessity be restricted on account of rules made by the United States Government for the improvement only of necessary roads and also by the increased difficulty in securing labor and material on



Grade Crossing Before Improvement—Looking East Towards Railroad Station.



Overhead Bridge Eliminating Grade Crossing and Two Narrow Overhead Bridges.

GRADE CROSSING ELIMINATION—HARTFORD-WILLIMANTIC TRUNK LINE—TOWN OF BOLTON, CONN.

account of existent war conditions. A total mileage of all classes of 27.74 mi. has been newly built during the year covered by this report, which brings the total net mileage of highways in the state, including both state aid and trunk lines, to 1,457.26 mi. Of this total, the department has reconstructed, with hard surface pavement, 31.27 mi., during the term of this report. * * *

In connection with the discussion of road construction, this department has become more firmly convinced that the necessities of present day traffic on main highways require the construction of pavements of a high character. Conditions at present are abnormal, but even without the war, there is a constant increase in the demand for a 12-month use of the roads which makes it necessary for us to expend more and more money in the construction of improved types of road surface at a considerable additional expense. It is hoped, during the coming year, to construct only such roads as are of vital necessity to the passage of through traffic or to the development of facilities for the prosecution of the war. This policy may interfere, in some instances, with the development of the state highway system from the

sufficiently strong to carry the traffic which goes over them. The Legislature of 1917 restricted the weight of vehicles passing over trunk line bridges to 25,000 lbs., and made a further restriction, to be used at the option of the Highway Commissioner, allowing only 16,000 lbs. to pass over certain bridges. All bridges on improved trunk line highways have, therefore, been strengthened to carry 16,000 lbs., and all new bridges have been constructed to carry not only 25,000 lbs., but a future extension of this limit to allow the passage of any load which may reasonably be expected to use the highways. The new bridges have been constructed of a permanent character, principally of concrete or reinforced concrete, and have been designed not only with a view of strength but with some idea of beauty. * * *

The increase in motor traffic during the past year has been abnormal and has made it necessary for this department to expend larger sums for the ordinary repairs of roads and to increase the expenditure for permanent repairs so far as was consistent with the state of our finances.

The cost of repairs, of course, has increased, due to the increase in the cost of both labor and material. The total



Old Bridge and Curve on Trolley.



New Bridge and Relocated Tracks.

ELIMINATION OF THE "DEATH TRAP" AT WINDSOR, CONN.

standpoint of the tourist or for the improvement of local communities, but everything must be done to further the country's interest, and this department expects to work in cooperation with the authorities at Washington in the development of roads which are a necessity, both from a military and commercial standpoint, in the successful completion of the war.

In the construction of trunk line bridges, the department has expended or contracted for the construction of bridges to the value of approximately \$300,000, which includes state funds and refunds to be received from towns, counties and street railway companies, making a net expenditure of the state in the vicinity of \$150,000. This money has not all been spent, but contracts have been let for several bridges now under construction. * * *

The past year has seen the completion of the Westport Bridge over the Saugatuck River in the town of Westport and the starting and partial completion of a bridge over the Housatonic River at Derby. Both of these bridges are of considerable magnitude, and the work has been delayed, chiefly on account of the difficulty of securing adequate labor and sufficient material to carry on the work.

The bridge at Westport was opened with appropriate exercises, and has improved traffic conditions materially on the Boston Post Road.

Investigations of existing bridges have been made and repairs carried out in order that these bridges might be

amount expended for both ordinary and permanent repairs of trunk line roads for the mileage under repair for the past four years is as follows:

1913-14	\$ 785,009.34
1914-15	879,936.44
1915-16	981,608.73
1916-17	1,495,486.45

These amounts include all expenditures for maintenance, ordinary and permanent work, plus the cost of oiling the state aid roads, which is paid for by the state out of the motor vehicle receipts. It will be noticed by comparing these figures that the charge for maintenance during the past year has increased steadily. The following table gives the cost of maintenance, ordinary, and the cost of permanent repairs, that is, the placing of permanent pavement on trunk line roads already constructed:

	Total.	Ordinary.	Miles Maintained.	Permanent.
1913-14	\$785,009.34	\$587,182.58	744.57	\$197,916.76
1914-15	879,936.44	665,761.70	906.92	214,174.74
1915-16	981,608.73	567,130.17	915.76	414,478.56
1916-17	1,495,486.45	709,419.64	923.43	786,066.80

The figures above quoted take no account of the cost of supervision and equipment, but have been collected to cover the net cost to the state. The source of the funds for this purpose was an appropriation of \$1,000,000 for two years, or \$500,000 for one year, made by the Legislature of 1915, plus the receipts from automobile fees for the fiscal year, Oct. 1, 1916, to Oct. 1, 1917, plus small amounts of money available

(Continued on page 4.)

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

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New Series, Vol. XVI

Number
1

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

July 6, 1918

RESTRICTIONS ON THE USE OF BITUMINOUS MATERIALS FOR MAINTENANCE

Until the world war compelled this country to take careful stock of its resources the policy of conservation was something either unknown or extremely repugnant to the average inhabitant of the United States. With a population only a little less than the combined population of France and Germany, scattered over an area nearly nine times as large as the combined area of those two countries, we have suffered from a tendency to look upon our resources as unlimited. What is worse we have failed to realize that even were they sufficient for all time they could be of no use to us unless developed.

With each week of war have come additions to the list of materials that must be used economically—that must be saved for the absolutely essential work of winning the war. Many of these have caused nothing more than personal inconvenience—the sacrifice of something that most of us could just as well do without. Some have entailed real hardships, but have been borne with the cheerfulness that could rightly be expected. A few have resulted—or will soon result—in serious injury and in losses greater than the gain they are expected to make unless the rigidity of their enforcement is tempered with a very large measure of common sense and judgment.

One of these is the restriction of the use of bituminous material in road work.

Were the making of dustless roads the only function of oil and tar their limited use would perhaps cause no damage that would not be offset by the good use that could be

made of those materials in some other way. As a matter of fact, however, that is not their chief function.

Since bituminous materials came into general use in road work there have been developed several types of pavements and surfacings that require annual renewal of the binder. Some of these are expensive, and in the aggregate the pavements that can be so classified represent a heavy investment, and a paying one. If the material necessary for maintenance is not procurable these highways will deteriorate, many of them to the point where they will require very costly reconstruction.

These facts are fully understood by road engineers and officials. They should be brought home to all who have to do with highways and the control of materials entering into construction and maintenance.

GOOD ROADS WAR-TIME NECESSITIES

Of all the activities in this country today there is not one—essential or non-essential, directly or indirectly making for the successful prosecution of the war or without apparent value to that end—that is not dependent upon the highways.

Country roads and city streets are not only as vital to the needs of the nation now as they ever were, but are of even greater importance. While it would doubtless be impossible to find any particular road or part of a road which of itself could be said to be indispensable, the whole system of highways is second in importance to no one of the resources upon which the country must depend.

The statement that roads are essential has been repeated time and again in these columns during the past months and will probably have to be repeated many more times. The situation is summed up very strikingly in the current report of State Highway Commissioner Bennett of Connecticut, part of which is printed on other pages of this issue. Because the case is stated so clearly and forcibly his statement is repeated here. He says, in referring to the men from the department who have entered the country's service:

"The department is proud not only of the men who have gone, but of the men and women who have stayed and are carrying out the routine work of the department, which seems of vital necessity at this time. Attempts have been made to belittle the value of highway work during the present crisis. It is my opinion that an immense amount of importance is attached to the proper maintenance and construction of highways at this time. In other words, no restriction in the maintenance of highway surfaces should be made, and the construction of highways should be carried on so that the system of highways will be continuous and available for the transportation of men and material needed for war purposes.

"The steam railroads and other transportation facilities are loaded beyond their capacity. Added to this the difficulty of securing labor and the future intensive transportation of coal and munitions would seem to indicate the necessity for further development and use of the highways by motor truck. Consequently it seems that the work of this department is highly important and not to be classed with the unnecessary and unessential things to be discontinued because we are at war."

What Commissioner Bennett says of Connecticut is equally true of every other state in the Union. The men who are building the roads, from the head of a state highway department down to the humblest day laborer on the job, are doing work which will count heavily in the main business of the United States. Road building alone will not win the war any more than will the making of munitions, the dispatch of an army overseas or the raising of enormous funds, but it will make possible the countless activities that are factors in the one big job.

The justifiable expenditure for roads, meaning the cost in labor and materials, must be determined by the same rule that always should have governed—when the return will be greater than the cost the work should be done. And because roads are so very important there should be no needless unwinding of red tape to determine whether or not a project should be carried out. In most cases likely to arise it will be safe to give the work the benefit of the doubt.

Highway Work in Connecticut

(Continued from page 2.)

and unexpended from previous appropriations. The grand total of all expenditures, including refunds, supervision and equipment, for the year was \$1,657,846.81.

Attention is particularly called to the increased expenditure for permanent improvement, namely, the placing of hard pavements on roads already constructed. The total amount is almost twice that expended in any previous year.

The above figures for cost of repairs have to do only with the trunk line highways for which the state pays the entire cost of repairs, and the oiling of state aid roads which is done at the state's expense.

The ordinary repairs of state aid roads are made by this department in cooperation with the towns, the state paying three-quarters of the cost and the town one-quarter. The entire initial expense is borne by the state and refunds are made by the town at periodic intervals. The following figures show the annual gross expenditure for the past four years for the maintenance of state aid highways:

		Miles Maintained.
1913-14	\$119,678.73	380.84
1914-15	165,741.54	481.92
1915-16	178,765.88	513.24
1916-17	191,955.89	533.83

The cost of supervision for both state aid and trunk line maintenance is as follows:

1914-15	\$54,084.94
1915-16	61,856.17
1916-17	57,700.47

These amounts include expenditures for office and field supervision in the repair department.

The following amounts were also spent for repair equipment, including motor trucks, crushers, rollers, scrapers and other small tools.

1914-15	\$24,105.96
1915-16	55,271.37
1916-17	65,307.98

It has been found necessary to increase our equipment from year to year to take advantage of the use of machinery in the repairs of highways and to provide for rapidity in execution. Separate books are kept of the equipment account, which provides for a daily charge against the individual jobs for each piece of equipment other than small tools, and in this way, the cost of the equipment is separated among the different jobs upon which the machinery is used.

As stated in the item under "construction," it has been found necessary in many instances to replace the existing roads with pavements on a concrete foundation or of concrete. Our experience has shown us that the concrete road so far has been thoroughly successful and with one exception no serious defects have been found, the exception mentioned being due to faulty construction.

The automobile fees for the past year have increased to an amount sufficiently large to take care of the ordinary repairs of roads, provide for supervision and to also do some work in the replacement of roads with permanent pavement. This was a result which was very much desired by this department since it brings us to the point where we

take care of the ordinary maintenance of roads out of current income from the users of the roads, which is a sound and workable principle.

Even with the increase of motor vehicle fees, it is necessary to provide additional appropriations for replacements, and this policy has been adhered to by the Legislature of 1917, so that our program of replacements can be carried on consistently and in such a manner as to provide hard-surfaced roads where they are most needed.

In connection with the maintenance of roads the Legislature of 1917 provided that the State Highway Department should remove snow from the trunk line highways in such a manner as to allow motor traffic to pass over the roads during all months of the year. We expect to carry out this work during the coming year, so far as it is possible, to the satisfaction of users of the highway. There is extreme difficulty, however, in making this work fit all classes of travel, and there will doubtless be causes for complaint. The necessity seems to be for the removal of snow so that travel can pass not entirely without obstruction, but with the least obstruction to traffic of all kinds whether it be vehicular or by sleighs.

The department has under construction one section of post road under the Federal Aid Act, and has submitted other projects to the authorities at Washington. The proper necessary legislative steps were taken by the Legislature so that this department can secure all the funds available for federal work in Connecticut. The amounts available are as follows:

1917	\$31,090.44
1918	62,180.88
1919	93,271.32
1920	124,361.76
1921	155,452.20

It must be clearly understood that this money is available for the construction of highways only under jurisdiction of the State Highway Department; has no connection with the town or county government; must be expended on continuous sections of roads and not in the improvement of small sections here and there for local benefit.

Attention is called to certain particular pieces of construction which have been carried to completion during the past year.

The elimination of a grade crossing at Bolton, Conn., was done in cooperation with the N. Y., N. H. & H. R. R. Co. This particular piece of work eliminates one dangerous grade crossing and straightens out several bad turns in the highway. The work, while not entirely completed, is opened to traffic and is satisfactory.

The elimination of the dangerous condition at Windsor has been completed after the two contractors had defaulted in the construction. The work was completed by the state and the road is open to traffic and is a material improvement on the conditions which previously existed.

On the main highway between Hartford and New Haven, an improvement in alignment was made in the town of Berlin by building a straight road a mile long in place of the old road which was constructed on another location with several bad turns.

Several material improvements have been made on the Post Road between Port Chester, N. Y., and New Haven, by replacing the old surfaces with hard pavements.

Small sections of concrete or bituminous pavement on concrete base have been built at various points throughout the state to improve conditions where the frost broke up the roads in the spring.

It is the intention during the coming year to pay particular attention to the road up through the Naugatuck Valley in order to accommodate the extremely heavy motor truck traffic which has developed in that vicinity.

It is the intention of the department to improve dangerous conditions on trunk lines in Yalesville and on the Hartford and New Haven trunk line in the town of North Haven at what is known as the Muddy River Bridge, and in the town of Hamden on Dixwell Ave., by realigning the highway so as to provide better traffic conditions.

These particular places were mentioned in the previous report and an appropriation has been made sufficiently large to cover the improvement during the coming fiscal term.

This department has been continuously suggesting a definite policy on the part of the state with reference to the elimination of dangerous railroad grade crossings on trunk line highways.

As the motor vehicle traffic increases, the liability of accidents becomes more and more evident. It would seem that the state, the railroad companies and the different municipalities should cooperate in doing away with the menace to life existent at every railroad crossing. We have had several extremely bad accidents during the past year which clearly prove the necessity for the development of some definite plan as outlined above.

The Legislature of 1917 established a motor vehicle department for the administration of the motor vehicle law, the issuance of licenses, etc. This department and the State Highway Department have cooperated where points of contact exist. It has been found that restrictions in weight of vehicles and in the character of vehicles which use the road should remain in the hands of the State Highway Commissioner. There seems to be a tendency on the part of the motor vehicle user to disregard the clause regarding the weight of trucks to be used on the road. The bridges have been posted, which should not carry a load in excess of eight tons, but motor trucks persist in using these bridges without regard to the law.

The system of inspection installed by the motor vehicle commissioner will, undoubtedly, be of material assistance in restricting speed and reducing the number of accidents
* * *

The department is proud, not only of the men who have gone (men in service), but of the men and women who have stayed and are carrying out the routine work of the department which seems of vital necessity at this time. Attempts have been made to belittle the value of highway work during the present crisis. It is my opinion that an immense amount of importance is attached to the proper maintenance and construction of highways at this time. In other words, no restriction in maintenance of highway surfaces should be made, and the construction of highways should be carried on so that the system of highways will be continuous and available for the transportation of men and material needed for war purposes.

The steam railroads and other transportation facilities are loaded beyond their capacity. Added to this, the difficulty of securing labor and the future intensive transportation of coal and munitions would seem to indicate the necessity for further development and use of the highways by motor truck. Consequently, it seems that the work of this department is highly important and not to be classed with the unnecessary and unessential things to be discontinued because we are at war.

Oregon Bonds to be Sold

Issue of \$690,000 for Highway Purpose to be Disposed of July 9

The Oregon Highway Commission has fixed July 9 as the date for receiving bids for \$690,000 of highway construction bonds, the issuance of which was recently approved by the Capital Issues Committee.

On March 15 of this year, the commission sold \$500,000 worth of these bonds, which bear 4% interest and mature serially for 20 years beginning in 1923. The bonds were sold at 91.17. Two former issues, sold in August and September of 1917, brought 94.42 and 94.26 respectively. It is stated that the municipal bond market is now stronger than it has been and the probability is that this issue will bring a higher price than heretofore. The money derived from the sale of the bonds will be used to pay obligations to contractors. The Oregon law permits the issuance of \$810,000 worth of highway bonds during the year, but because of the opposition of the Capital Issues Committee it is not expected that further sales will be made.

North Dakota Motor Vehicle Act Upheld

Law Providing Revenue for Roads Declared Constitutional Despite Unconstitutionality of One Section

The North Dakota motor vehicle act has been held constitutional by the Supreme Court of that state in spite of the unconstitutionality of one section, according to a recent report.

The act was passed in 1917 and provides about \$500,000 annually for road work. Action was recently brought by the City of Fargo to test the constitutionality of a section providing that none of the money collected could be expended within the corporate limits of a municipality. The decision of the court sustained all portions of the act except one section giving the secretary of state unlimited authority to employ agents and assistants. It was held that this section was unconstitutional as it delegated legislative authority, but that the unconstitutionality of the one section did not affect the validity of the act as a whole.

Government Housing Project Appointments Announced

Town Planners and Engineers Appointed by the Department of Labor

The Department of Labor has recently announced the appointment of architects, town planners, and engineers for work in connection with the various housing developments which have been projected. The names of the town planners and engineers in the various projects are as follows:

Project No. 10, Erie, Pa., town planner, C. D. Lay, New York, N. Y., engineer, Chester & Fleming, Pittsburgh, Pa.; Project No. 18, South Charleston, W. Va., town planner and engineer, James L. Greenleaf, New York, N. Y.; Project No. 24, Bethlehem, Pa., town planner, T. W. Sears, Philadelphia, Pa., engineer, L. J. H. Grossart, Bethlehem, Pa.; Project No. 59, Bath, Me., town planner, Lorrington Underwood, Boston, Mass., engineer, Weston & Sampson, Boston, Mass.; Project No. 62, Quincy, Mass., town planner, H. J. Kellaway, Boston, Mass., engineer, Ernest W. Branch, Quincy, Mass.; Project No. 102, Bridgeport, Conn., town planner, A. A. Shurtleff, Boston, Mass.; Project No. 141, Puget Sound, Wash., town planner, E. T. Mische, Portland, Ore., engineer, Sawyer Bros., Spokane, Wash., George B. Sawyer of Sawyer Bros., Seattle, Wash.; Project No. 150 a. b., Norfolk and Portsmouth, engineer, Nicholas Hill, New York, N. Y.; Project No. 378, Watertown, N. Y., town planner, F. Vitale, New York, N. Y., engineer, E. W. Sales, Watertown, N. Y.; Project No. 581, Mare Island (Vallejo), Cal., town planner, P. R. Jones, San Francisco, Cal., engineer, S. E. Kieffer, San Francisco, Cal.; Alliance, O., town planner, De Forest, Rochester, N. Y.

MOTOR VEHICLE TRANSPORTATION

Novel Tractor for General Hauling

A tractor of novel design, known as the "Autohorse" and adapted to a variety of haulage uses, is manufactured by the One-Wheel Truck Co. of St. Louis, Mo. In one of the two accompanying illustrations the machine is shown hauling a tank wagon. The other illustration is a plan view of the tractor, showing the arrangement of the engine and other units.

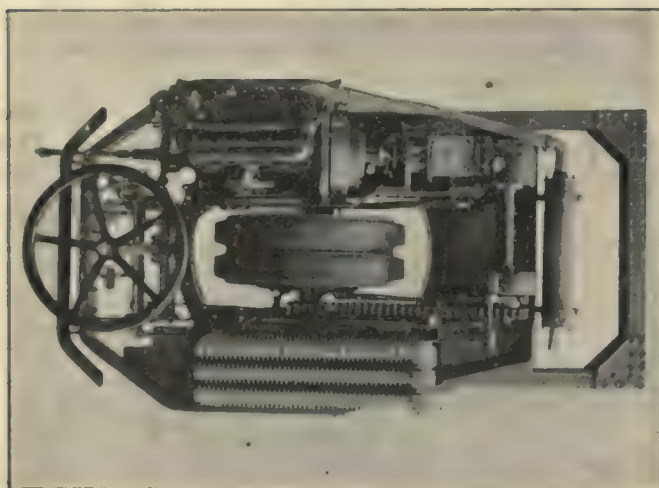
The unusual feature of the machine is the use of only one wheel. This is placed at the center and is carried on a $3\frac{1}{2}$ -in. axle. The main frame carries a circular frame with teeth on

axle of the vehicle drawn. Auxiliary wheels can be attached to the rear of the frame, if desired.

Trucks and Semi-Trailers Haul Merchandise

Two Middle West Corporations Solve Transportation Problems with These Units

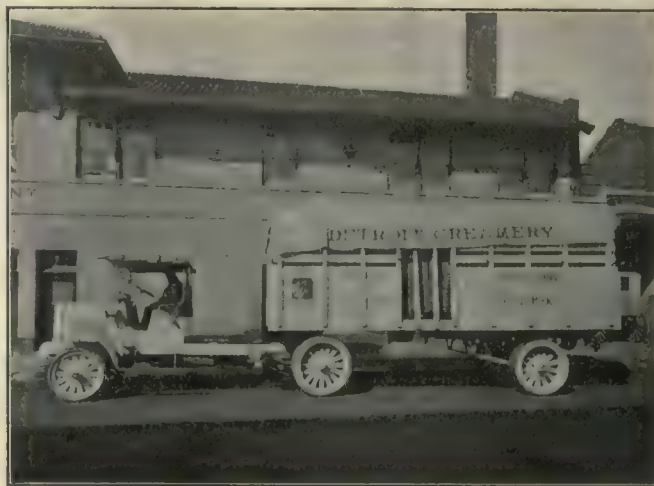
Two corporations in the Middle West have made successful use of a unit consisting of a truck and a semi-trailer in the



PLAN VIEW OF "AUTOHORSE" CHASSIS.

the outside which engage with teeth on the steering wheel shaft and permit turning the one wheel, with the cab and driving mechanism, through an angle of 360 degrees. The machine is driven by a 22 hp. 4-cylinder Continental motor with a $3\frac{3}{4}$ -in. bore and a 5-in. stroke. Power is carried to the wheel through a Borg & Beck disc clutch and a Warner transmission, providing three forward speeds and one reverse. The motor is fitted with a model M, Stromberg carburetor and a high tension magneto. The cooling system comprises a radiator carried on the left side of the machine and a rotary water pump.

The "Autohorse" is attached to a trailer or wagon by means of couplings carried at the rear of the frame and on the front



FRUEHAUF SEMI-TRAILER AND GMC TRUCK.

delivery of the goods they handle. The two outfits are shown in the accompanying illustrations.

Both concerns, the Great Atlantic & Pacific Tea Co., and the Detroit Creamery, use Fruehauf trailers. The Great Atlantic & Pacific Tea Co. recently purchased two of these to carry goods between warehouses and retail stores in Detroit. One trailer is loaded at the warehouse while the other is being used to make deliveries, thus eliminating loss of time in waiting for loads. They are used with a Pierce-Arrow truck.

The Detroit Creamery uses a trailer and a G. M. C. truck for hauling milk to one of its large branches. The work was formerly done with three 5-ton trucks, two of which



AN "AUTOHORSE" IN OPERATION.



FRUEHAUF SEMI-TRAILER AND PIERCE-ARROW.

have been released for other work since the purchase of the trailer. The total saving effected, it is stated, will amount to several hundred dollars annually.

Progress of Packard Hauling Efficiency Competition

A large number of entries have already been made in the truck hauling efficiency contest inaugurated by the Packard Motor Car Co. of Detroit, and noted in "Good Roads" for June 1. Among the concerns which have entered are:

The Standard Oil Co., Chicago "Daily News," Southern Express Co., Cudahy Packing Co., Liquid Carbonic Co., Sprague, Warner & Co., Cincinnati Iron & Steel Co., the Crane Co., National Cash Register Co., Fleischman Co., Barrett Co., Highways Motor Transport Co., Cleveland Brass & Copper Co., U. S. Post Office, Sinclair Refining Co., Indian Refining Co., Henry Disston Sons, Libbey Glass Co., Edward Ford Plate Glass Co., and American Rolling Mills.

The names of the men who are to judge the contest have recently been announced by the Packard Co. They are: H. P. Gould, Editor, "100 Per Cent. Efficiency Magazine;" H. W. Slauson, Motor Editor, "Leslie's Weekly," and Waldemar Kaempffert, Automobile Editor, "Popular Science Monthly."

Urge Cooperation of State Authorities in Drive-Aways

The National Automobile Chamber of Commerce is back of a movement to secure the cooperation of state authorities in facilitating the delivery of motor cars by the drive-away method.

During the first three months of this year, 33% of the

of accident or infraction of the motor vehicle laws, and it is held that in the case of a string of cars in a drive-away, improvised duplicates of the manufacturer's or dealer's license plate sufficiently establish the identification.

Passenger Cars to Carry Harvest Labor

The latest work to which the passenger car has been put to help win the war is the transportation of farm labor during harvest time, according to C. T. Silver, metropolitan distributor of the Kissel Motor Car Co.

Automobiles were used for this purpose last year, it is said, and will be used still more this season. Local automobile owners, dealers' associations, automobile clubs and other individuals and organizations are planning to donate their automobiles and their services to carry men to and from farms. It is pointed out that as there are practically 5,000,000 automobiles and trucks in operation in the country today, an army of 5,000,000 people could be transported each week if only one-fifth of these vehicles, each one carrying five people, were employed one day a week.

Long, Heavy Haul by Truck

The accompanying illustration shows how an unusually heavy load was carried a distance of 2 mi. by means of a motor truck.

The work was done by R. R. Sprague of Dover, N. J., and consisted of hauling two bridge girders 81 ft. 6 in. long and weighing 20 tons, to a bridge over the Rahway River at Cranford, N. J. The rear wheels, which weigh a ton, were placed



GARFORD TRUCK HAULING STEEL BRIDGE GIRDER 81 FT. 6 IN. LONG.

cars produced by eight of the largest automobile manufacturers were delivered over the highways. The number of machines sent out in these drive-aways was 38,900, which means that about 10,000 freight cars were released for other purposes. It is pointed out by the chamber that with a probable production of 1,000,000 motor vehicles this year, the total number of railroad cars saved will be about 80,000.

Considerable trouble has been caused by local officials, according to the statement, who insist that every car in the drive-away strings shall carry a state license plate and sometimes that each driver shall have a state operator's license. Because of the lack of uniformity in the motor vehicle laws of the various states, and because full compliance with requirements of one state is not held sufficient in other states, much delay and annoyance has resulted. The purpose of a license plate is to identify the car and its ownership in case

40 ft. from the truck. The load was taken on at a freight yard where the ground was very soft and the truck with its load was run over 6-in. thick planking until the pavement was reached.

Approval of a Bond Issue in Road District No. 5, Riverside County, California, has been refused by the Capital Issues Committee. The amount of the proposed issue was \$260,000, and the work contemplated was the improvement of roads radiating from the town of Blythe in the Palo Verde Valley. A description of the proposed work was printed in "Good Roads" for March 9, 1918 ("Proposed Road Improvement in the Palo Verde Valley in California"). R. W. Waterman, engineer in charge of road work in the districts, states that no further attempts will be made to complete the work until after the war.

MEETINGS

Calendar of Coming Meetings

July 13.—Northwestern Society of Highway Engineers.—Quarterly meeting, Portland, Ore. Secretary, C. G. Reiter, Hillsboro, Ore.

Aug. 7-9—North Carolina Good Roads Association.—Annual convention, Wilmington, N. C. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

American Society for Testing Materials

The 21st annual meeting of the American Society for Testing Materials was held at the Hotel Traymore, Atlantic City, N. J., on Tuesday, Wednesday, Thursday and Friday of last week.

On Thursday evening the society met in a joint session with the American Concrete Institute. At this and the other sessions of the meeting several papers and committee reports dealing with road building materials were presented. A schedule was printed in "Good Roads" for June 22.

The report of Committee D-4, on road materials, L. W. Page, chairman, recommended that several of the existing tentative standards be referred to letter ballot for adoption, and proposed changes in a number of others. The standards recommended for adoption are as follows: Test for determination of apparent specific gravity of coarse aggregates, form of specifications for certain commercial grades of broken stone; definitions of terms relating to materials for roads and pavements.

New Jersey Association of County Engineers

As noted in "Good Roads" for June 29, sub-committees on specifications were appointed at a regular meeting of the New Jersey Association of County Engineers on June 21 and 22.

These sub-committees will work under the Specification Committee which consists of F. A. Reimer, County Engineer of Essex County, Chairman; A. H. Nelson, County Engineer of Atlantic County, and Alvin B. Fox, County Engineer of Middlesex County. The members of the several sub-committees appointed at the meeting are as follows:

Block: T. J. Wasser, County Engineer of Hudson County, Chairman; F. A. Reimer, County Engineer of Essex County; J. L. Bauer, County Engineer of Union County.

Bituminous: Harry F. Harris, County Engineer of Mercer County, Chairman; Alvin B. Fox, County Engineer of Middlesex County; James Logan, County Engineer of Burlington County.

Broken Stone: Grant Davis, County Engineer of Hunterdon County, Chairman; Winfield Hopkins, County Engineer of Morris County; Harry W. Vetter, County Engineer of Warren County.

Concrete: Garwood Ferguson, County Engineer of Passaic County, Chairman; George D. Cooper, County Engineer of Monmouth County; R. S. McClave, County Engineer of Bergen County.

Gravel and Shell: L. M. Rice, County Engineer of Cape May County, Chairman; A. H. Nelson, County Engineer of

Atlantic County; J. S. Sparks, County Engineer of Salem County.

Arrangement and General Clauses: R. S. McClave, County Engineer of Bergen County, Chairman; F. A. Reimer, County Engineer of Essex County; W. J. Harden, County Engineer of Sussex County; Joshua Doughty, County Engineer of Somerset County.

Details: J. J. Albertson, County Engineer of Camden County, Chairman; J. M. Abbot, County Engineer of Ocean County; William C. Cattell, County Engineer of Gloucester County.

Legal Clauses: William C. Cattell, County Engineer of Gloucester County, Chairman; Walter M. Sharp, County Engineer of Cumberland County; A. H. Nelson, County Engineer of Atlantic County.

American Concrete Institute

The annual convention of the American Concrete Institute was held at the Hotel Traymore, Atlantic City, N. J., on Thursday, Friday and Saturday of last week.

The opening meeting was held Thursday evening, as a joint meeting with the American Society for Testing Materials. The session on Saturday forenoon was devoted to papers and committee reports dealing with roads and pavements. A list of these was printed in "Good Roads" for June 22.

PERSONAL MENTION

Lieut.-Col. W. W. Crosby has advised his friends of his safe arrival overseas.

H. M. Maire has resigned as City Engineer of Port Arthur, Tex., to enter Government service.

L. B. Hitchcock has been appointed City Engineer and Superintendent of Streets of Phoenix, Ariz.

Harry C. McClure, Commissioner of Engineering and Construction of the City of Toledo, O., has been commissioned a captain in the Ordnance Department of the U. S. Army.

Gregg Black has been appointed City Engineer of Vicksburg, Miss., to succeed C. R. Twiss, whose resignation was noted in this column last week.

E. B. Adams has resigned from the office of the City Engineer of Grand Rapids, Mich., to enter the employ of the Portland Cement Association. Mr. Adams will have headquarters at Detroit.

Burwell Bantz has been appointed City Engineer and Superintendent of Water Works of Chehalis, Wash., to succeed W. G. Peters, resigned. Mr. Bantz was formerly County Engineer of Island County, Washington.

George W. Tillson has resigned as Consulting Engineer to the President of the Borough of Brooklyn, New York City. Mr. Tillson has been prominently identified with street work in Greater New York for many years. He was at one time engineer in charge of street pavements in the City of Brooklyn, and since the formation of the Greater City has served as Chief Engineer of the Bureau of Highways of Brooklyn and of the Bureau of Highways of Manhattan, later being made Consulting Engineer to the Borough President of Brooklyn.

GOOD ROADS

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THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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NEW YORK, JULY 13, 1918

Number
2

Superelevations and Easements for Highway Curves

Tables of Superelevations and Easement Offsets Prepared and Used by the Road Engineers of King County, Washington

By C. P. MOWRY *

The accompanying table and diagram of superelevations and offsets for easement curves are used by the highway engineers of King County, Washington, in the construction of paved roads. The tables are the outcome of the experience of our engineers with existing tables which did not appear to give sufficient elevation to properly accommodate traffic. Roads are now being built with curves laid out in accordance with these tables and they appear to be giving satisfaction to all who are using them.

*Office Engineer, Office of County Engineer, King County, Washington.

The superelevations given are based upon an empirical formula:

$H = .05d$; where

H = the superelevation of a 20-ft. roadway in feet, and
 D = degree of curve.

This formula was used for curves up to 40 deg. and, as will be noted, by reference to the table, curves of a greater degree than 40 have the same elevation, as it was felt that to carry this formula to extremes would result in an embankment so steep it would be dangerous to vehicles standing on the road or to horses walking.



SUPERELEVATED 30-DEGREE CURVE ON THE DUWAMISH-RENTON JUNCTION ROAD IN KING COUNTY, WASHINGTON—A 20-FT. CONCRETE PAVEMENT WIDENED TO 24 FT. AT THE CURVE

The easements are used to provide a transition from the tangent to the main curve as indicated on the diagram and the change from the regular section of the pavement to the full superelevation is made entirely within the limits of the easements.

It will be noted that the easement is not a true spiral, as at the point where connection is made with the main curve the radius of the easement is bound to be somewhat less than that of the main curve. This, however, was not felt to be serious in highway construction as vehicles do not necessarily follow a line precisely parallel to the center line of the road.

It is believed that the tables are self-explanatory, but the following example of an application is given:

Assume that the main curve is one of 30 deg. and it is desired to find the proper data to lay out the superelevation and the easement:

Enter the table along the center line showing the degree of curve. The amount of offset from the tangent will be found in the column immediately above corresponding to the distance from the beginning of the easement shown in the left-hand column, while the superelevation for a 20-ft. roadway is indicated immediately below, the distance from beginning being indicated in the left-hand column as before. Tabulated data for a 30 deg. curve are given in the following table:

30-deg. Main Curve—80-ft. Easement—20-ft. Roadway.		
Distance from Beginning of Easement, in Feet.	Offset from Tangent, in Feet.	Superelevation, H, in Feet.
10	.05	.02
20	.20	.09
30	.44	.21
40	.78	.38
50	1.29	.59
60	1.90	.84
70	2.84	1.15
80	4.20	1.41
90	6.58	1.60

It should be noted that one-half of the easement is laid off on the tangent before reaching the beginning of the original curve.



PLAN AND ELEVATION OF BANKED CURVE

KING COUNTY ENGINEER'S OFFICE SUPER ELEVATION & OFFSETS ON CURVES ON

PAVED HIGHWAYS

Samuel J. Humes, County Engineer.

February, 1918.

Degree of Curve

100 Ft. Easement.

Ft.	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°	54°	56°	58°	60°	Ft.			
110																					12.75	13.41	14.07	14.74	15.41	16.08	16.76	17.44	18.12	18.81	19.50	110		
100																					8.82	9.27	9.72	10.17	10.62	11.08	11.54	12.00	12.46	12.93	13.40	100		
90																					6.23	6.55	6.87	7.19	7.51	7.84	8.16	8.49	8.82	9.15	9.48	90		
80																					4.57	4.81	5.05	5.29	5.53	5.77	6.01	6.25	6.49	6.73	6.97	7.21	80	
70																					3.03	3.22	3.41	3.60	3.80	3.99	4.18	4.37	4.56	4.75	4.94	5.13	70	
60																					2.43	2.55	2.67	2.80	2.93	3.06	3.19	3.32	3.45	3.58	3.71	60		
50																					1.65	1.73	1.81	1.90	1.99	2.08	2.16	2.24	2.33	2.42	2.51	50		
40																					1.06	1.11	1.16	1.21	1.27	1.33	1.38	1.43	1.49	1.55	1.61	40		
30																					.60	.63	.66	.69	.72	.75	.78	.81	.84	.87	.91	30		
20																					.27	.28	.29	.30	.31	.33	.34	.35	.36	.38	.40	20		
10																					.07											10		
0																																	0	
10																					.09	.02										.02	10	
20																					.11	.11	.12	.13	.14	.15	.16	.17	.18	.19	.20	.21	.22	20
30																					.13	.14	.15	.16	.17	.18	.19	.20	.21	.22	.23	.24	.25	30
40																					.15	.16	.17	.18	.19	.20	.21	.22	.23	.24	.25	.26	.27	40
50																					.17	.18	.19	.20	.21	.22	.23	.24	.25	.26	.27	.28	.29	50
60																					.19	.20	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30	.31	60
70																					.21	.22	.23	.24	.25	.26	.27	.28	.29	.30	.31	.32	.33	70
80																					.23	.24	.25	.26	.27	.28	.29	.30	.31	.32	.33	.34	.35	80
90																					.25	.26	.27	.28	.29	.30	.31	.32	.33	.34	.35	.36	.37	90
100																					.27	.28	.29	.30	.31	.32	.33	.34	.35	.36	.37	.38	.39	100
110																					.29	.30	.31	.32	.33	.34	.35	.36	.37	.38	.39	.40	.41	110
Ft.	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°	54°	56°	58°	60°	Ft.			

Compiled by C.E. Williams & C.P. Mowry, 1917.

Made by F.B. Lacroix, Feb. 1918.

Distance from Beginning of Easement.
O = Offset.
h = Super Elevation.
NOTE:—See Sketch accompanying.

Offset
Super Elev.

TABLE OF SUPERELEVATIONS FOR CURVES AND OFFSETS FOR EASEMENTS

Space will not permit of a theoretical discussion of the assumptions that were made in the drawing up of the tables, but they were based upon the elements of safety and comfort. The following table shows the theoretical, safe, and comfortable speeds in miles per hour in rounding curves banked according to the formula.

The 30-deg. curve shown in the illustration has been made by the writer in a Ford car at 30 mi. an hour without serious discomfort.

Degree of Curve.	Radius of Curve.	Safe Speed, Miles per Hour.	Comfortable Speed, Miles per Hour.
10.....	573.....	55.....	37.....
20.....	286.....	38.....	28.....
30.....	191.....	33.....	25.....
40.....	143.....	30.....	23.....
50.....	114.....	27.....	20.....
60.....	95.....	24.....	18.....

The study from which the formula was evolved was made by the writer with the assistance of members of the engineering force, under the direction of Samuel J. Humes, County Engineer.

Solving the Municipal Traffic Problem^{*}

By R. E. ENRIGHT†

The regulation of traffic, always a most important problem in large cities, has become a most vital issue for the safety and security of human life in the City of New York. Only 14 years ago an American city first took up this problem, when in the City of New York the present scheme of traffic regulation, borrowed for the most part from the police of London, was first instituted along the highways of the Borough of Manhattan and in a few streets in the Borough of Brooklyn.

This scheme of traffic regulation has taken on patentable improvements, and has been widely extended throughout the great metropolitan district, and has been emulated by practically every city and town of any size throughout the entire country.

The success of traffic regulation in the City of New York has led to a general study of traffic conditions throughout the country, and particularly throughout the State of New York; and it has indeed become not only a system of traffic regulation, but also an intensified study of street conditions and street accidents to the end that the life and limb of the people who must use the streets shall be better protected.

Without going into details as to what may improve traffic regulations generally it may be relevant at this time to call attention to the advisability of properly licensing all drivers of vehicles in all cities of the first and second classes in this state.

This would give the police authorities a control over these men and would not only make them more accountable, but it would eliminate the class of drivers who make a considerable part of the criminal classes engaged in petty thievery from trucks throughout the state.

Some better form of safety zone appliance should be placed in service to replace the temporary stanchions now in use, and the lighting should be of a more substantial nature than the lanterns now employed.

It seems as if the solution of the problem in the City of New York has reached its limitations under existing conditions, and that there is little more that may be done until radical changes are effected. Therefore, with the tremendous increase in motor vehicles, as well as a rapidly growing population largely concentrated in a restricted section of the city during the daytime and early evening, it becomes more and more evident that the city must grapple with this problem more searchingly, along broader lines than ever before, and must find means to meet the situation.

It is necessary that traffic conditions be improved, for unless the business of this great city can be promptly,

efficiently and economically handled through the streets of the metropolitan district, it will be impossible for the business interests of the city to thrive, and they will be obliged to transfer their plants elsewhere in order to compete with their rivals more favorably located. Should this occur we would rapidly lose our preeminence as the greatest city of America, the state would lose in power and, more than all, its revenue would be greatly reduced.

The building of elevated speedways and underground tramways for north and south traffic in the Borough of Manhattan is a matter of the most vital importance, and cannot be longer delayed if we are to meet the situation in a comprehensive and business-like way.

The burden of such an improvement should not be placed upon the taxpayers in one year, but may well be scattered over a generation of years, for it will constitute a public improvement that will be lasting and for the benefit of all those who come and go for the next 25 years.

Nor is this a matter entirely for local consideration, but it is, indeed, a matter which should have the support of the state government, and the state should be required to pay its share of this great improvement.

The city of New York pays 70% of the entire taxes of the state, and is entitled to some return in the shape of public improvement. Conditions in this great metropolitan center, which mean so much for the entire state because it is the market place of the state and its principal supporter in all lines of finance and taxation, should be the supreme concern of the remainder of the state and receive its unflinching support and cooperation.

For many years the National Government has considered it an economic duty to improve the harbors and waterways of this country with funds from the national treasury. The State of New York has spent many millions of dollars in improving the roadways of this state, but with very little exception none of this improvement has reached the territory embraced in the City of New York. As it is the duty of the Federal Government to provide good waterways for the city, so it is the manifest duty of the state to provide safe roadways in the city of New York as well as throughout the rural districts. It must be borne in mind that a large part of the traffic in this city is state and interurban, and the entire cost and responsibility should not be saddled upon New York City.

The official in charge of traffic affairs in the City of New York at this time is a man of big business and big ideas along this line. He is not only willing to give his own time gratis for the solution of this problem, but he is giving, and is willing to give, a great deal from his own purse for the formulation of plans and the making of tests which will demonstrate the necessity for the improvements that this

^{*}Address at the Ninth Annual Conference of Mayors and Other City Officials of the State of New York at Newburgh, N. Y., June 11, 1918.

[†]Police Commissioner of the City of New York.

hour so strongly demands. In solving this problem he should have not only the sympathy and support of the city administration, which he has to the full, but also the support and friendly cooperation of the state officials and the state Legislature.

We do feel that in the present Secretary of State, who perhaps of all the state officials is more familiar with and more directly interested in the solution of this problem than any other, we have a friend and supporter who is always ready and willing to advance the improvement of traffic regulation, not only in the state at large, but in the great city of New York.

Let me repeat that when New York City is paying 70%

of the tax of this state, it is paying for 70% of the cost of roadways of the state, and it would require no very careful inspection to show that it has received in return a very small percentage of the improvement that has been made on the roadways of this commonwealth.

I, therefore, appeal to this distinguished audience, representing as it does the highest officials of the state and its large municipalities, you whose greatest interest is the growth and welfare not only of this great state but also of the great city that means so much to every citizen of this commonwealth, to cooperate with the city of New York in providing safe streets, and, therefore, first-class traffic conditions, for this is the most important city of the world.

The Council of National Defense*

Its Relation to the Work of the Highways Transport Committee

By W. S. GIFFORD†

The transportation problem in war-time has become one of the necks of the bottle—if not the neck of the bottle. Very early in the progress of our preparations for defense—even before we went to war with the German Government—a committee had been formed on transportation, both steam and electric railways transportation, under the supervision of Mr. Daniel Willard, a member of the Advisory Commission of the council. This committee was a start in the mobilization of the transportation resources of the country for the defense of the country. The committee opened offices in Washington and the leading railroad executives of some of the principal roads came to Washington, lived and transacted business in Washington, bringing together as far as possible all of the railroad facilities of the country under a single directing and guiding administration. At the same time a committee was formed of the electric railroads. This committee proceeded to work out methods by which the electric lines could supplement the work of the steam railroads in transporting troops, and, in certain parts of the country, in transporting freight and materials.

Very shortly after the formation of these committees we went to war with Germany and our efforts towards coordinating and mobilizing resources were hastened and transportation work proceeded more rapidly. The Committee on Inland Waterways was formed to assist the Government in its war program by developing the use of inland waterways and thus relieving, as far as possible, the burden on the steam railways. Still later we formed the Highways Transport Committee, which is developing an increased use of the highways for the transportation of materials and supplies, thus again relieving the enormous strain and burden put on the railroads. The Council of National Defense has recognized that the inland war-time transportation problem is in a sense a trinity which consists of steam and electric railroads, inland water transportation and highway transportation. The work of the Railroad Committee proceeded rapidly and ended in the appointment of the Director-General of Railroads, who also took over the work on inland water transportation and utilization of inland waterways.

The work of highways transportation is still under the council and I expect it will remain under the council. Our problem is, specifically, to increase the use of the highways as far as possible, and to increase that use to relieve so much as can be the burden and strain on the other trans-

portation facilities of the country. The need for such relief I hardly need to explain—particularly in the eastern part of the country, north of the Potomac and east of Pittsburgh, as the strain that has been put on our transportation facilities there has been enormous. It is only by every possible method of lessening that burden that we are going to be able to carry through the tremendous war program we have ahead of us without hardship and possible breakdown and confusion. There are two ways of relieving this strain: First, by doing less shipping of materials, and, second, by increasing facilities. The first can be brought about to a certain extent by urging people to economize, to buy as little as possible, and by urging them to get along without things that are not absolutely necessary, thus relieving transportation of non-essential goods. However, that relief will be more than offset by the increase in the shipping demands of the war program. We must not only relieve the burden, therefore, but we must increase the facilities for carrying the necessary burden. One important way of increasing facilities is through highways transport. I won't go into details of it—other gentlemen here are better qualified to speak of the details of this work. The work of the Highways Transport Committee is considered necessary and valuable by the Council of National Defense, the Director-General of Railroads, and other executives who are directing the war work in Washington.

Just a word as to our method of organization and our method for accomplishment. After all, a problem such as highways transport, and most of the problems which are handled by the Council of National Defense, must be solved by the cooperative efforts of the people back on the job around the country. We are not an executive department in the sense of having a very large group of paid people working for us, or in a sense of giving orders which must be obeyed by people in other parts of the country, but we hope to be able to give certain directions, certain advice and certain assistance regarding work which must be done by you gentlemen. It is up to you—each and every one—to do all you can to assist in carrying out the ideas and views which will be expressed by the committee in Washington—not that those views will not be bettered and assisted greatly by your advice, but that after they are determined upon, whole-hearted team work with the Highways Transport Committee of the Council of National Defense means that we will have throughout the country a large army of people who are all doing their part in making this great work of highway transportation successful and relieving the strain on the railroad.

*Address at a meeting under the auspices of the Highways Transport Committee of the Council of National Defense at Washington, D. C., June 4-5, 1918.

†Director, Council of National Defense.

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Number
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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

July 13, 1918

SUPERELEVATIONS AND EASEMENTS FOR HIGHWAY CURVES

Up to the time when most of the roads in the United States had been laid out, an easement was a refinement quite properly left out of consideration in road design. The superelevation of a curve was of even less concern to the road builder.

With the revolution that has come in highway traffic in the past ten years the application of these two principles to highway design has come to be requisite to both safety and comfort. This is especially true of superelevations, for an automobile traveling at the speeds frequently attained is in danger rounding a curve that is not banked. Easements are not so much needed, either for safety or greater ease of riding, but unquestionably add to both as well as enhance the appearance of the road.

The more progressive highway engineers have long recognized the necessity for superelevating curves, and the methods employed in one highway department are described and illustrated on other pages of this issue. These two principles do not require modification because of local conditions to the extent that most road building methods do, so that the tables worked out by the engineers of King County can be used by engineers generally.

While the King County tables are worked out for hard-surfaced pavements, neither superelevations nor easements need be or should be restricted to such surfaces. Earth, gravel and macadam roads require the same treatment, though, naturally, less refinement of design is necessary.

Curves on roads of these types have often been banked and rough easements have been provided in many cases.

SPEND NOW TO SAVE LATER

Road maintenance must go on uninterruptedly or the taxpayers of the country will have to pay an enormous bill for the restoration of the highways after the war.

Something like a quarter of a century ago, systematic, intelligent road improvement was commenced by a few of the states in the northeastern part of the country. Today there is a highway department in practically every state and in most of the states the department is one of the major divisions of the government.

During this era of road improvement, the annual expenditure throughout the nation has grown from an insignificant sum to a total well over a quarter of a billion dollars.

To date probably not more than twelve and one-half per cent. of the country's road mileage has been surfaced. Considered merely as a percentage, this showing is not encouraging, but when it is remembered that this one-eighth means an actual mileage of something over three hundred thousand, the magnitude of the work accomplished is better appreciated. Another fact that must be taken into consideration is that a large majority of the traffic of the country is carried on a small proportion of the total mileage and the greater part of the work of improvement has been done on these more important highways.

Some of the money spent for road betterment has been wasted. Some of it has been used for permanent work, the amount involved representing an investment that cannot be lost. A very large proportion of the total expenditure has been used for the construction of pavements and surfaces of varying durability and of different needs as to maintenance. The money they represent is an investment also, but one that can and will be lost if the upkeep of the roads is neglected.

The country's roads are worth billions of dollars, even if nothing more than their first cost is taken into account. Their present value, in terms of service rendered, is literally incalculable, for without them every activity would have to cease.

The successful prosecution of the war is the chief business of the American people today. But that doesn't mean that every American should be fighting or working in a munition plant or on a farm. There are countless other activities that are contributory to the three obvious essentials and every one of them in turn is absolutely dependent upon transportation. The things men use are seldom used where they are produced; they have to be carried over the roads, over the railroads, up and down rivers, through canals and across oceans. Many of them are carried by water; most of them are also carried by rail. Practically all of them are carried by road, sometimes once, oftener at least twice.

The nation's highway system is the foundation of its whole vast and complicated machinery of transportation. The public highways are indispensable and they must be kept in condition unless all the work we have done is to avail us nothing and the work yet before us is to be left undone. Money must be spent and labor and materials must be used now.

Motor Mail Service showed a surplus of \$200,000 for the first six months of its operation, according to James I. Blakeslee, Fourth Assistant Postmaster General, in a recent statement made at a hearing before the House Post Office Committee on a resolution authorizing the Post Office Department to build highways. According to Mr. Blakeslee, this showing warrants the extension of the service throughout the country.

Road Improvement in 1918

Further Expressions of Opinion on Highway Work in 1918 by State Highway Officials

In the issue of June 15 leading highway officials from several of the states commented upon the road building situation and the prospects for work during the present season. Since that issue was printed replies to the inquiry sent out by "Good Roads" have been received from several other state officials. The text of these additional letters is presented in the following paragraphs:

B. M. ATWOOD

State Engineer of Arizona.

While it is needless to state that we are deeply interested in the construction of needed roadways as rapidly as possible, we must admit that we are in doubt in regard to the expediency of endeavoring to carry on large highway construction projects during the period of the war.

Our attitude in regard to this matter is much the same as that of Mr. Noah in regard to building arks after the beginning of the flood. We appreciate now more than ever the force of the arguments we were making several years ago in regard to the importance of spending large sums of money at that time for developing our highway system. We feel that that was the time the public should have listened to us and that possibly the Government was itself remiss in not encouraging more expenditures for road building at that time.

It does not follow, however, that under the present status it is a wise or useful thing to undertake to build those roads, the construction of which we were urging two or more years ago. We feel that now it is extremely doubtful whether they could be completed in time to be of service to us in the present crisis.

We are accordingly turning our attention to a large extent to those expenditures in the way of maintenance and improvements that will make the present roads as useful as possible in order to get through the war as well as we can with the roads now available.

We are willing, in fact, to spend money to make roads temporarily useful regardless of construction of ultimate economy merely to keep traffic going over them with as little trouble as possible to the traffic itself.

You will readily understand that in our own particular work we are in the habit of using local materials to a large extent, so that the problem of freight transportation has not entered into our conclusions to any great extent, and we realize that in this respect our position is somewhat unique and our experience and plans in regard thereto are of relatively little value in most of the other states.

WILLIAM B. OWEN

Commissioner of State Lands, Highways and Improvements of Arkansas.

In our wire to you some weeks ago we stated that our expenditure would amount to \$15,000,000 this year if uninterrupted, but we feel that it will be cut short on account of having bond issues cut out by the Capital Issues Committee.

The actual bond money which is being used in the state for the construction of roads at the present time amounts to \$6,371,865. This money is distributed in districts in the several counties in the state covering a mileage of 706.5 mi. The contract price of this work amounts to more money than the bond sales noted above, but this difference is covered by federal and state appropriations amounting to \$630,776.

These amounts of money will be expended as rapidly as materials can be obtained, but increased freight rates, which

are already authorized, will add more than \$150,000 to our contract prices.

As to the advisability of speeding up the work, I can't see how it can be speeded any more at the present time. All bond issues of more than \$100,000 have to be approved by the Capital Issues Committee, and all material shipments have to be given time to reach their destination. Taking these conditions into consideration you can readily see that what we do will have to take its turn in the order of things and the speeding part will be practically nil.

Up to this time we haven't established a ruling governing types of roads, but owing to the increased truck traffic in our state that is a matter that will require attention from this time. Some of our gravel and macadam roads are already inadequate, and the maintenance is going to be quite an item.

W. S. GEARHART

State Highway Engineer of Kansas.

The position the State Highway Commission has taken in Kansas is that all of the most important work should be carried on just as far as possible without interfering with farm operations or the winning of the war.

We have a large amount of surfaced road work financed, and the plans, specifications and estimates are being prepared just as rapidly as possible. The contracts will be let wherever it seems advisable, and it is our general policy to crowd this work along just as far as it is practical to do so. This may mean that on many projects we will not be able to do more than get the work ready to advertise for letting, but since the financing of the roads and preparing the plans, specifications and estimates generally require from six months to a year's time we feel that all this preliminary work should be done now and that if we find later that the work cannot be contracted and completed until after the war we will be in good position to start the work just as quickly as conditions will permit.

Local materials are being used wherever practical, and the roads to be improved are nearly all highways which constitute a part of our federal aid road system, and will therefore come under the control of the Federal Government. No means have been adopted as yet to regulate heavy traffic.

Important Road Contracts Awarded in Pennsylvania

State Highway Commissioner O'Neil of Pennsylvania has awarded four contracts amounting to \$280,364.72 for the construction of important sections of highway in Cambria, Clinton, Potter and Tioga Counties. The work is to be done in cooperation with the counties and townships, half the cost being borne by the local units and half by the state. The contracts awarded are as follows:

State Highway Route No. 62, Cambria County, 11,336 ft., vitrified brick, to John T. Blair of Ebensburg at \$118,602.22; road in Avis Borough, Clinton County, 2,430 ft., reinforced concrete pavement, to B. H. Coryell of Williamsport at \$16,465.50; State Highway Route No. 101, Roulette Township, Potter County, 11,800 ft., reinforced concrete pavement, to Horn & Devling, of Galeton, at \$87,103; State Highway Route No. 103, Tioga County, 7,824 ft., reinforced concrete pavement, to George Serafini of Binghamton, N. Y., at \$58,194.

The only bid submitted for the construction of 28,891 ft. of reinforced concrete pavement on Route No. 165 in Northampton County, was rejected.

Who's Who for Good Roads

Men Prominently Identified with Highway Development.

From time to time we print on this page biographical sketches of the men who build the country's roads and the men who develop highway transportation—men who as a class are playing a most important part in the making of the nation. It is our hope that these brief sketches and the portraits that accompany them will serve to bring closer together the earnest workers all over the country who are devoting their lives to this great work.

John Craft

President, Alabama Good Roads Association

John Craft of Mobile, Ala., President of the Alabama Good Roads Association and a member of the Alabama State Highway Commission, was born in New Orleans, La., May 20, 1847. He came to Mobile when a youth and has lived in that city for over 50 years.

Mr. Craft was employed in the naval stores business in Mobile and later entered business on his own account. He continued in the mercantile business in Mobile until his retirement 25 years ago.

He has always taken an active interest in civic affairs, especially in road improvement. His attention was called to this branch of public work during the early part of his mercantile career in Mobile. At that time the city had a population of about 50,000 but had no paved streets. Mr. Craft organized a committee of merchants and called on the city authorities to improve the principal streets. The authorities failed to act, and Mr. Craft raised money by private subscriptions, and had one of the principal thoroughfares of the city paved with round cypress blocks.

In 1874 Mr. Craft was elected a member of the City Council and later was made chairman of the City Finance Committee. In these positions he was instrumental in securing for the city an improved street lighting system, a paid fire department in place of the volunteer department, improved water works, hospital improvements, and street pavements.

Mr. Craft is a member of the Alabama Convict Improvement Association, president of the Mobile Humane Society, president of the National Shell Fisheries of America, and is Food Administrator for Mobile. He has served as president of the Mobile Commercial Club, the Mobile Basin and Tennessee River Association, and the Alabama Oyster Commission. He has been president of the Alabama Good Roads Association since its organization.



JOHN CRAFT



A. T. RHODES



H. G. SHIRLEY

After leaving the employ of Mr. Rugg, he became the junior partner in the engineering and contracting firm of John F. Kelly & Co., where he remained for a year and a half. During this time he worked on the preliminary survey of the Raquette River water power development in New York State. This work included the planning of a large distributing reservoir, a large storage reservoir, and a steel pipe line 8 mi. long between Stark Falls and South Colton, N. Y. Upon the completion of this work, he entered the employ of the Central Building Co. of Worcester, and was engaged in heavy building construction for about one and one-half years. His next position was that of superintendent of construction with the George W. Carr Co. of Worcester, general contractors and builders, who specialized in road work and concrete construction of various kinds. His first work with this firm was as superintendent of two sections of the East Boston grade crossing elimination. He remained with this company until February, 1913, when he was elected Street Commissioner of the City of Worcester.

As Street Commissioner of Worcester for five and one-half years, Mr. Rhodes had charge of a great deal of very important work, including the construction of granite block pavements that have attracted very general attention among road builders. Worcester is the largest city in the East which does its own construction work, so that its street commissioner has to combine engineering and business ability to an unusual extent.

In May of this year, Mr. Rhodes resigned to become Field Engineer of the Granite Paving Block Manufacturers' Association of the U. S., Inc., succeeding Walter L. Weeden, who had served the association as Field Secretary. Because of his extensive experience with granite block paving in Worcester, Mr. Rhodes was chosen from a field of about 30 candidates.

Henry G. Shirley

Secretary of the Highway Industries Association

Henry G. Shirley, Secretary of the Highway Industries Association, was born in Locust Grove, W. Va. He was educated in private schools and graduated from the Virginia Military Institute at Lexington, Va., receiving a C. E. degree. He also holds the degree of D. Sc. from the Maryland Agricultural and Mechanical College.

Mr. Shirley's engineering experience has included railroad, road and other work. He was at one time connected with the engineering department of the New York Central Railway and later was employed in the engineering department of the District of Columbia. He also served as assistant engineer

Albert T. Rhodes

Field Engineer, Granite Paving Block Manufacturers' Association of the U. S., Inc.

Albert T. Rhodes, Field Engineer of the Granite Paving Block Manufacturers' Association of the U. S., Inc., was born in Spencer, Mass., in 1879. He attended the Worcester public school and graduated from the Worcester English High School in 1896, immediately entering the employ of Buttrick & Pratt, civil engineers, of Worcester. He remained with this firm for three years, and then spent one and a half years in the office of O. Willis Rugg, also of Worcester.

on the West Virginia Central Coal & Iron Extension and on the B. & O. Railroad.

Previous to his appointment as Secretary of the Highway Industries Association this spring, he was Chief Engineer of the Maryland State Roads Commission for six years. When appointed to that position he was Roads Engineer of Baltimore County, Maryland, where he had served for eight years.

National Aid for New York-New Jersey Tunnel

Bill Introduced in Congress Provides for Payment of Half from Federal Treasury

A bill appropriating \$6,000,000 from the Federal Treasury for the construction of a vehicular tunnel between New York and New Jersey was introduced in the House of Representatives and in the Senate on Friday, June 20, by Senator Calder of New York and Representative Eagan of New Jersey. The appropriation of federal funds is made conditional upon the appropriation of \$3,000,000 each by the states of New York and New Jersey.

This matter has been under consideration for a number of years and has been the subject of legislation in the legislature of both states concerned. New Jersey has already taken definite action. A bill was pending in the New York Legislature when it adjourned and favorable action is expected when it reassembles.

Convict Labor in Missouri

State Highway Commission to Establish Three Additional Camps for Road Work

The Missouri State Highway Commission has completed arrangements for the establishment of two additional convict labor road building camps, and is making plans for the establishment of a third.

The two camps to be opened in the near future will be in Reynolds and Carter Counties. An application for convict labor for road work has also been made by St. Louis County, following a demand by Colonel Hunter, Commandant at Jefferson Barracks, the army training camp near St. Louis, that the roads between St. Louis and the camp be improved.

While convict camps are already established in four counties in the state and are all proving successful, only about 200 of the 2,700 convicts in the state are employed on road work.

War Road Improvement in Pennsylvania

List of Roads Being Improved with \$500,000 Appropriation Set Aside for War Emergency Purposes

The State Highway Department has recently announced the roads that are being improved with the \$500,000 appropriation for the improvement of war emergency roads. The

PENNSYLVANIA ROAD WORK UNDER WAR EMERGENCY APPROPRIATION.

Route	County	Township	Length (Miles)	Character of Work	Amount
4	Luzerne	Plymouth	1.878	Resurf. "bitoslag"	\$ 20,062.00
161	Northumberland	Coal and Ralpho	2.505	Resurf. sheet asphalt	38,006.36
140	Schuylkill	No. Manheim	2.800	Resurf. sheet asphalt	44,604.60
142	Delaware	Haverford	.241	Resurf. sheet asphalt	3,757.00
142	Montgomery	Lower Merion	4.570	Resurf. sheet asphalt	71,243.00
42	Adams	Germany (near Littlestown)	1.563	Water-bound macadam	20,000.00
146	Berks	Amity and Exeter	4.240	Water-bound macadam	30,500.00
35	Franklin	Green	4.800	Water-bound macadam	43,200.00
42	Adams	Cumberland, Mt. Joy, Germany & Union	9.020	Gen. repairs	30,000.00
52	Cambria	Upper Yoder (south of Johnstown)	.930	Resurf. water-bound macadam	6,000.00
52	Somerset	Conemaugh	5.320	Resurf. water-bound macadam	57,500.00
50	Fayette	Henry Clay and Wharton	5.876	Resurf. asphaltic concrete	99,288.00
129	Lancaster	Mt. Joy, W. Donegal, E. Donegal	15.470	Gen. repairs	10,000.00
		Ralpho, W. Hempfield, Manheim and E. Hempfield			
129	Lancaster	Mt. Joy, W. Donegal, E. Donegal	12.543	Resurf. unbound macadam	16,000.00
		Ralpho, W. Hempfield, Manheim and E. Hempfield			
52	Somerset	Conemaugh		Bridge construction	1,000.00
52	Somerset	Conemaugh		Bridge construction	1,500.00
148	Lancaster	West Earl and Ephrata	1.870	Resurf. water-bound macadam	7,249.04
Total ..					\$500,000.00

The authors of the two bills claim that the tunnel could be built for not more than \$12,000,000, which they claim is about one-fourth of what it would cost to build a bridge between the two states. Plans have already been drawn and have been approved by General Goethals, State Engineer of New Jersey, and by many other prominent engineers.

In a statement given out by Senator Calder and Representative Eagan, attention is called to the great congestion of traffic at New York, and the great extent to which the tunnel will relieve conditions. It is pointed out that bridges and tunnels between Brooklyn and New York City made possible the almost entire superseding of transportation by ferry boats, but that vehicular traffic between Manhattan and New Jersey still has to depend upon ferriage. Another point made is that the waterfront space needed for docks for foreign commerce and for terminals for inland waterway shipments is now very largely used for handling the traffic of ferry boats, floats and lighters for carrying freight across the river. Reference is made to the recent conference under the auspices of the Highways Transport Committee at which the importance of highway transportation was emphasized. According to the statement, probably no single mile of highway in America would be more important or valuable or would carry a heavier traffic than would the roadway of the proposed tunnel.

work is being done by the forces of the Maintenance Division of the State Highway Department, and it is reported that satisfactory progress is being made.

The accompanying table shows the location, length, character and amount authorized for each road.

Motor Traffic in Pennsylvania

Enormously Increased Tonnage of Motor Vehicle Traffic Over Pennsylvania Roads Shown in Recent Report

That a greatly increased tonnage of motor vehicle traffic is passing over the roads and bridges of Pennsylvania is indicated by a report recently submitted by the automobile division of the State Highway Department.

According to this report, the receipts from all classes of motor vehicle registration and licensing in Pennsylvania for the period from Jan. 1 to June 30, 1918, were \$3,732,661. This is an increase of \$818,830 over the total receipts for the corresponding period of 1917.

This year 319,498 pneumatic-tired motor vehicles were registered, as against 251,788 last year. The number of solid-tired motor vehicles registered this year is 25,379, an increase of 10,594 over 1917. The largest increase in pneumatic tired motor vehicles is that in the type ranging from 20 to 35 hp., while the greatest increase in solid tired motor

vehicles is that in trucks weighing from 5,000 to 10,000 lbs., including vehicle and load.

The total number of motorcycles registered this year is 21,907, on which fees amounting to \$64,974 have been paid. During the corresponding period of last year 20,489 machines were registered. The traction engines registered number 1,529 and trailers, 871.

Street Paving Contracts Awarded in Boston, Massachusetts

Mayor Peters Approves Five Contracts Amounting to Nearly \$150,000

Mayor Peters of Boston has approved the award of contracts for the paving of five streets at a total cost of \$148,319.40. The contracts awarded are as follows:

A portion of Dorchester Ave., granite block, to Bernard E. Grant at \$24,570; portions of Clinton St., Cross St., and Mercantile St., granite block, to Coleman Bros., at \$52,382; a portion of Dartmouth St., granite block, to James Doherty at \$38,375; a portion of Sudbury St., to the Simpson Bros. Corporation, at \$18,318.40; portions of Park St., Somerset St., and Tremont St., Filbertine, to Warren Bros. Co., for \$14,674.

The Asphalt Industry in 1917

A Statistical Review of the Production and Sale of Asphaltic Products in the United States Issued by the U. S. Geological Survey

Activity in the domestic market for asphaltic materials derived from crude petroleum and for imported asphalts has been stimulated by the war, while the relative abundance and adaptability of those materials has resulted in a decreased demand for native bitumens and for various types of bituminous rock produced in this country, according to a recent statement of the U. S. Geological Survey, based on statistics compiled under the supervision of J. D. Northrop.

During 1917 a total of 80,904 short tons of native bitumen including maltha, gilsonite, elaterite and grahamite, bituminous rock, and ozokerite, was marketed from mines and quarries in the United States. This was 17,573 tons or 18% less than the amount marketed in 1916. The market value of the 1917 output was \$735,924 as compared with \$923,281, the value of the output in 1916. While the production of gilsonite, bituminous sandstone, bituminous shale (elaterite), and ozokerite was considerably greater in 1917 than in 1916, the gain was offset by a loss in the production of other asphaltic materials.

The quantity of manufactured asphalt, including road oils and flux, produced from petroleum was about 2% more in 1917 than in 1916, while there was an increase of about 13% in corresponding materials manufactured in this country from Mexican petroleum. These resulted in a net gain of nearly 7% in the total production in 1917 as compared with 1916.

A total of 701,809 short tons of manufactured asphalt derived from domestic petroleum was sold in 1917. This comprised 327,142 tons of solid and semi-solid products used for paving and roofing and 374,667 tons of liquid products including road oils, fluxes and asphaltic paints. The value of solid and semi-solid products was \$4,011,980, and that of the liquid products, \$3,722,711; making the total value \$7,734,691.

The total sales of solid and semi-solid products derived from Mexican petroleum in 1917 was 338,485 short tons valued at \$4,657,152, while the corresponding sales for liquid products were 307,128 tons valued at \$2,784,661.

The imports of native asphalt, oil asphalt, and bituminous

rock for consumption in the United States for 1917 aggregated about 187,886 short tons valued at \$993,115. This item shows a gain of 28% in quantity over 1916.

The exports of unmanufactured asphalt in 1917 amounted to 30,107 short tons valued at \$587,256. In 1916, 40,816 short tons were exported. Other asphalt products exported in 1917 had a total value of \$585,472 as against \$494,895 in 1916.

High Road Bids in Tennessee

State Highway Commissioner Rejects as Too High Bids on Two Federal Aid Projects

Bids received on June 24 and 25 by the Department of Highways of Tennessee for work on two federal aid projects have been rejected as too high.

The work advertised was on federal aid project No. 3 in Franklin County and federal aid project No. 4 in Bedford and Moore Counties. After thoroughly considering the bids, according to State Highway Engineer A. M. Nelson, they were rejected on the ground that the unit prices were unreasonable. It is stated that the high prices may have been caused by the disturbed condition in the local labor situation, as several large Government plants are being constructed in the vicinity of Nashville, and the fact that work on them is being pushed regardless of expense probably had some effect upon the bids received.

On project No. 3, bids were received from three contractors. Some of the unit prices are shown in the following table:

Item	Unit	Unit Prices		
Common excavation.....	cu. yd.	\$0.58	\$0.65	\$0.58
Solid rock excavation.....	"	1.45	1.40	1.30
Class A concrete.....	"	12.00	12.50	13.50
Class B concrete.....	"	11.00	11.50	12.50
Dry masonry.....	"	9.00	5.00	6.00
15-in. metal pipe.....	lin. ft.	1.62	1.81	1.96
18-in. metal pipe.....	"	2.27	2.53	2.36
24-in. metal pipe.....	"	3.70	3.54	3.81

Some of the unit prices from the two bids submitted on project No. 4 were as follows:

Item	Unit	Unit Prices		
Common excavation.....	cu. yd.	\$0.55	\$0.60	\$0.60
Solid rock excavation.....	"	1.40	1.40	1.50
Class A concrete.....	"	12.50	12.00	12.00
Class B concrete.....	"	11.50	11.00	11.00
Special concrete.....	"	13.50	15.00	15.00
15-in. metal pipe.....	lin. ft.	1.81	1.75	1.75
24-in. metal pipe.....	"	3.54	3.60	3.60

The Iowa State Highway Commission is using women to replace men in its drafting rooms, according to a recent statement. Seventeen of them are already actually at work or are receiving training for the work, thus releasing men to take up duties in the field.

The Roads of Oklahoma County, Oklahoma, have suffered greatly from the heavy rains during the spring, according to a recent report from Oklahoma City. The county commissioners have made an inspection trip over some of the most badly washed roads, and, according to their report, a great deal of work will have to be done in order to put the roads into as good condition as they were last summer.

Data on Automobile Accidents on the roads of New York State during the first four months of 1918 have recently been made public by the National Highways Protective Association. The number of fatal accidents on roads outside of New York City during January, February, March and April was 30, as compared with a total of 77 during the corresponding months of 1917. Attention is called to this decrease, which is regarded as remarkable, in the face of the fact that for a decade prior to the present year the number of accidents showed a steady increase annually. The low number this year is ascribed by the association to the work of the new state police, which, among other duties, takes care of the enforcement of the automobile laws.

MEETINGS

Calendar of Coming Meetings

Aug. 7-9—North Carolina Good Roads Association.—Annual convention, Wilmington, N. C. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

The Good Roads Association of York County, Pennsylvania, was organized at a recent meeting of the York Motor Club. H. H. Forrey of York was made chairman. The object of the association is to carry on a campaign for improved highways among road supervisors, motorists and road users in general.

An organization known as the Arkansas-Louisiana Highway Association, Louisiana Division, was organized at a recent meeting at Monroe, La. The object of the association is to promote the construction of an improved highway from the Arkansas state line through Morehouse, Ouachita, Caldwell, LaSalle, Grant and Rapides Parishes to Alexandria. Officers were selected as follows: President, C. H. McHenry, Monroe; Vice President, H. Flood Madison, Bastrop; Secretary-Treasurer, G. T. Cross, Monroe.

PERSONAL MENTION

Frederick A. Delano has resigned from the Capital Issues Committee to enter the army.

H. G. Merriweather has resigned as Assistant City Engineer of Denver, Colo., to engage in private practice.

Paul C. Kingensmith, formerly Bridge Engineer of the Indiana State Highway Commission, has been made Research Engineer of the Indiana Public Service Commission.

Dr. Edgar Marburg, Secretary-Treasurer of the American Society for Testing Materials, died on June 27. Dr. Marburg had served as Secretary-Treasurer of the society since its incorporation in March, 1902.

Dudley Cates, of San Francisco has been appointed Secretary and Chief Examiner of the Capital Issues Committee. Mr. Cates will have charge of the creation of a new bureau of examiners to consider applications for security issues.

E. M. Johnson, formerly Assistant Credit Manager of the Universal Portland Cement Co., has been appointed Credit Manager to succeed Robert F. Atkins, who has resigned. Mr. Johnson's headquarters will be at Pittsburgh, Pa.

John M. Goodell, who was at one time editor of "Engineering Record," and for the past six months has been employed in the personnel division of the United States Shipping Board, has been appointed consulting engineer of the Office of Public Roads and Rural Engineering of the U. S. Department of Agriculture.

Robert F. Atkins has resigned as Eastern Credit Manager of the Universal Portland Cement Co. to become Credit Manager of the Emergency Fleet Corporation.

A. J. Joyce has been appointed Assistant Credit Manager of the Universal Portland Cement Co. at the Chicago office, to succeed E. M. Johnson, who has been appointed Credit Manager.

Sedley H. Phinney has been made Secretary of the Bureau of Municipal Research, of Philadelphia, Pa., succeeding Robert E. Tracy, who resigned some months ago to become Director of the Research Bureau of Indianapolis.

PUBLICATIONS

"HIGHWAY MAINTENANCE IN NORTH CAROLINA," by D. H. Winslow, Maintenance Engineer, North Carolina Highway Commission, and Charles B. Thomas, Assistant Professor of Civil Engineering, North Carolina State College of Agriculture and Engineering. No. 2, Vol. 17, State College Record, North Carolina State College of Agriculture and Engineering. Paper 6x9 in., 18 pp.; illustrated.

As indicated by the title, this publication is a brief treatise on maintenance work on North Carolina highways. It is profusely illustrated by views showing various phases of the work.

WISCONSIN HIGHWAY COMMISSION, "INSTRUCTIONS TO ENGINEERS." Compiled by Gordon F. Daggett, Engineer of Surveys and Plans, Wisconsin State Highway Commission; Pamphlet No. 7. Paper 4x7 in., 66 pp.; illustrated.

This pamphlet, according to the introductory statement, was written "as a guide for surveyors to follow in case of questions arising in the field and where responsibility for a correct solution of the problem rests with the individual." Its contents include sections on state aid surveys, state aid plans, federal aid surveys, federal aid plans, bridge surveys, and foreign surveys. There are several illustrations showing notebook forms, title sheets, location sketches and the like.

WISCONSIN, MILWAUKEE COUNTY HIGHWAY DEPARTMENT. Sixth annual report, for the year ending Dec. 31, 1917. Paper 6x9 in., 56 pp.; illustrated, insets.

This report contains a very brief general statement, followed by a tabular recapitulation of the work done and the expenditures made, several paragraphs covering machinery and overhead costs, a brief financial statement, and detailed statements of work on different roads. There are also included a number of inset tables, showing the details of paving, grading, culvert, maintenance and other work. The report is printed on heavy paper of unusually good quality, and is illustrated by portraits of the County State Road and Bridge Committee, an organization chart of the highway department, and views of road work in the county.

U. S. DEPARTMENT OF AGRICULTURE, OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING. "THE RESULTS OF PHYSICAL TESTS OF ROAD BUILDING ROCK IN 1916 AND 1917," by Prevost Hubbard, Chemical Engineer, and Frank H. Jackson, Jr., Assistant Testing Engineer, Office of Public Roads and Rural Engineering. Bulletin 670, Department of Agriculture, dated June 14, 1918. Paper 6x9, 30 pp.

This bulletin is a supplement of Bulletin No. 370, giving results of tests of rock made previous to Jan. 1, 1916, and supersedes Bulletin No. 537 of the department. It lists results of a large number of tests of road building rock made by the Office of Public Roads and Rural Engineering, and describes the crushing strength or compression test which was made in a number of cases. Most of the bulletin is taken up by a table showing the results of physical tests of road building rock from the United States and Canada from Jan. 1, 1916, to Jan. 1, 1918. Another table shows the results of compression tests of rock made prior to Jan. 1, 1916.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, JULY 20, 1918

Number
3

Construction and Maintenance of Concrete Pavements in Milwaukee County, Wisconsin

The Highway Department of Milwaukee County, like other highway departments of counties and states, encountered many difficulties in the performance of its duties last season. During no period since its organization, according to the 1917 report of County Highway Commissioner F. W. Whitlow, has the department been confronted with so many serious problems as during the season of 1917.

Two of the chief hindrances were the labor situation and the scarcity of materials occasioned by the car shortage. In spite of these, practically all of the work planned at the beginning of the season was finished, and the ability to carry out the contemplated work is ascribed to the employment of convict labor.

The total expenditure of the department for the year, including amounts outstanding on Jan. 1, 1918, and a small amount paid in 1917 for 1916 work, was \$622,482.49. This was divided as follows:

State aid roads	\$493,226.00
Road maintenance	27,037.43
State aid bridge work.....	48,380.63
Other bridge work.....	1,397.00
Miscellaneous	52,441.43
	\$622,482.49

The principal expenditures for state aid road work were

for grading and paving. The amounts for these and other items of state aid road work were as follows:

Grading	\$79,949.05
Culverts	22,736.86
Paving	380,371.34
Guard rail	1,687.93
Curb	281.06
Curb and gutter.....	2,545.01
Sewers	5,674.76
	\$493,226.00

Most of the paving laid during the year was of concrete. The total area of that pavement put down was 224,009 sq. yd., and the total cost, not including grading and similar work not incidental to the construction of the pavements, was \$345,466.22. While this makes the average cost per sq. yd. \$1.54, the actual unit costs varied from 69.5 ct. on one small job of only 161 sq. yd. to \$1.71.

Grading done amounted to 120,210 cu. yd., and cost \$79,949.05. The unit prices ranged from 32 ct. to \$1.26. Culvert work involved a total of about 1,600 cu. yd. of concrete at a cost of approximately \$22,700.

The total road mileage of the county on Jan. 1, 1918, was 144.75, and the total yardage, 1,621,802. Of this, concrete comprised 126.98 mi., or 1,347,288 sq. yd.



Cedarburg Road, North from County Loop.



Green Bay Road near Keipper's Park.

CEMENT CONCRETE ROADS IN MILWAUKEE COUNTY, WISCONSIN.

The cost of maintaining 1,148,157 sq. yd. of concrete pavement on 107.93 mi. of road was \$24,717.07. The distribution of this cost was as shown in the following table:

	Labor.	Materials.	Total.
Road surface	\$4,368.37	\$1,871.94	\$6,240.31
Shoulders	5,572.37	4,673.56	10,245.93
Guard rail	656.05	620.37	1,276.42
Miscellaneous	2,916.93	4,037.48	6,954.41
Totals	\$13,513.72	\$11,203.35	\$24,717.07

Considerable experimental work in reinforcing and resurfacing cement concrete was carried out during the year. It is yet too early to arrive at any definite conclusions as to the merits of work of this kind, according to report, but it is the intention of the department officials to watch the pavements and make careful note of the results.

Road Work in Missouri

Projects Involving a Total Expenditure of About \$2,250,000 Under Way in Various Parts of the State

In spite of the difficulties incident to carrying on road work under present conditions, road projects involving a total cost of \$2,258,316 are under way in Missouri, according to a recent report.

Of the 50 projects included in the improvement program of the state, 22 have been awarded and work commenced. Surveys, plans and estimates for the remaining 28 have been completed and the money for going ahead with the work is available. The cost of improving the 514 mi. included in the program will be borne by the counties or special road districts and the Government.

New Jersey Seeks Federal Aid

State Highway Authorities Ask Government for \$936,000 for the Repair of Military Highways

The New Jersey State Highway Commission is urging the appropriation of federal funds for the repair of the highways in the state which are carrying heavy Government traffic.

The state authorities point out that there are over twenty Government reservations in the state, and that while the state can take care of the roads included in the state system, at least \$936,000 will be required for the maintenance and improvement of other important roads. It is said that the state has already spent \$150,000 for the maintenance of these thoroughfares and has also insisted that the counties vote large shares of their allotments from the motor vehicle funds for the same purpose. In spite of these measures the highways are becoming worse, and their maintenance is beyond the financial power of the state, the counties or the local units. In the following schedule are shown the highways requiring improvement and the estimated costs:

"Atlantic, mail road from Hammontown; Elwood to plant of Atlantic Loading Co., 6 mi.; estimate, \$190,000. If not improved there should be provided a maintenance fund of \$25,000.

"Burlington, main road from Trenton and the north to Camp Dix; section Bordentown to Georgetown, 6 mi.; estimate, \$150,000.

"Salem, Fort Mott and county road at Harrisonville, 3 mi.; estimate, \$16,000.

"Cape May, mail road from Wissahickon Naval Barracks to Cape May line, ¾ mi.; also Lafayette St., city line to Pennsylvania Railroad station. Respective estimated costs, \$27,000 and \$30,000.

"Middlesex, St. George's Ave., Rahway to Colonia Base Hospital, 2½ mi.; estimate, \$65,000; Bonhampton to Metuchen, Perth Amboy Road; estimate, \$60,000. Army officials have requested the state to improve 2 mi.

"Hudson, Newark Plank Road across meadows, between Newark and Jersey City, past U. S. Engineer Depot and shipyards on Newark meadows; estimate, \$50,000.

"Monmouth, Little Silver Station to Red Bank, leading from Camp Vail; estimate, \$38,000.

"Bergen, Creaskill Ave., from Grant Ave. to Washington Ave.; estimate, \$15,000; Madison Ave. from camp, east toward Creaskill station; estimate, \$16,000; Madison Ave. from bottom of hill to railroad station, \$15,000; Creaskill station to Alpine, 8½ mi.; estimate, \$35,000; Jefferson Ave., from Madison Ave. to Jay St., 1 mi.; estimate, \$20,000."

Illinois Road Bids Too High

Division of Highways Rejects Bids for Sections of the Dixie and Lincoln Highways

The Division of Highways of the Illinois Department of Public Work and Buildings has rejected bids for the improvement of sections of the Dixie and Lincoln Highways in the northern part of the state, holding that the bids were too high. A part of the statement issued in connection with the action of the officials follows:

"Because of the uncertainties of the situation brought about by war conditions no blame can be attached to contractors. Contractors are obliged to take into consideration many things over which they have no control, among which are the following:

"The liability of a wide variation in the cost of labor.

"Possible difficulty of obtaining labor at any price.

"Impossibility of determining the cost of materials.

"Difficulties likely to be encountered in transportation and shortage of cars.

"Possibility of further advance in freight rates.

"In view of the foregoing it was deemed best to take the action indicated. It was recommended, however, that an investigation be made in conjunction with the federal authorities to determine whether these federal aid roads be considered of sufficient importance for the movement of fuel, crops, munitions and other war materials to warrant their construction by the state itself."

North Bank Highway to Be Completed

Work on Uncompleted Section of Scenic Highway Along the Washington Bank of the Columbia River to be Started

According to a recent report from Washington, work on the unopened section of the North Bank Highway, or State Road No. 8, is to be started in the near future. The work is to be done on a 4-mi. stretch between Cooks and Collins in Skamania County.

The Government is to do the work through the Forest Service, about \$94,000, most of its Government money, being available. Walter L. Bowen, the engineer in charge, has stated that the date of the opening of the road will depend largely upon the amount of labor that can be obtained, but hope is expressed that the road will be ready for use by the spring of 1919. The work is to be done by day labor, as no contract was awarded when the work was advertised.

Three work camps are to be established; one at Wind Mountain, one at Sepsecan, and one at another point which has not yet been decided upon. Much of the equipment is already on the ground ready for use.

The completion of this road will make accessible much of the wonderful scenery along the Columbia River in sections which have not yet been reached by road. With the Columbia River Highway on the Oregon side of the river, the Portland-Vancouver Interstate bridge and the White Salmon-Hood River auto ferry, the road will form an automobile tour loop of great attractiveness.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

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3

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

July 20, 1918

CONTRACTING IN WAR TIME

Road contractors have suffered heavily as a result of the abnormal conditions brought about by the war. Their work has been hampered at every turn by inability to get materials on time, if at all; by rising prices that could not be forecasted with any degree of accuracy, by labor shortages, and by scores of difficulties that have caused financial losses not seldom resulting in bankruptcy.

Many of the factors in this situation could not be provided for in advance. Road jobs often last for months, frequently being carried over from one working season to the next. Innumerable contracts made before this country entered the war were suddenly subjected to conditions making their fulfillment impossible except at a loss. The carrying out of those made since the declaration of war has been rendered about as uncertain, for orders and rulings, new prices, labor complications or other disturbing elements are of almost daily occurrence.

There is no reason why contractors should bear the whole burden. On the other hand, it would not be right for the party of the first part to assume the entire hazard.

For a long time contractors have contended—and with much of right upon their side—that the average contract form and the usual type of specifications discriminate against them. Both contractors and engineers have urged reforms in this direction, and something has been accomplished; but the abnormal conditions that have obtained during the past two working seasons have shown that there is still a great deal to be done to get a form of contract that will be fair to both parties.

In some instances the same factors that have called attention to the need for changes have also resulted in the adoption of various expedients for utilizing the experience and the plants of contractors without imposing the risks consequent upon the execution of a contract of the usual type. Further progress along this line is desirable. There are many able and responsible contractors whose services are needed now as they never were before. These men are the possessors of valuable experience and skill; they have efficient equipment at their command, and they are willing and ready to undertake their share of the very necessary work of building and maintaining the country's roads. But they should not be expected to do so under conditions that impose upon them the burden of the present uncertainties in the material and labor markets. Means should be found to relieve them of these and leave them free to devote their energies to the actual work in hand. Modifications of the "cost plus" method and the utilization of the contractor's talents to direct "force account" work immediately suggest themselves. Others can and doubtless will be worked out.

It is very likely that some of these methods will yield such satisfactory results that they will remain in use after the war. If so they will take their place among the by-products of the conflict that will be of real benefit.

THE SOLUTION OF OUR TRANSPORTATION PROBLEMS

Recent "publicity" matter issued by the Treasury Department of the United States contains a three-paragraph article under the caption "Our Transportation Problems." In it the statement is made that the Railroad Administration "is solving gradually many problems." The means employed include the elimination of unnecessary passenger trains, the loading of freight cars to capacity and routing freight by the most direct route. These and other methods adopted by the administration "are doing much to ease the strain on our transportation facilities," according to the statement.

We do not question the effectiveness of any of the means listed. Even in the face of the fact that freight rates and passenger tariffs are higher and the service poorer than they were in the days when "unnecessary" passenger trains were run, freight cars were sent out not loaded to "full capacity" and freight was not routed by the "most direct" route, we are willing to concede that the administration is "solving gradually many problems." One of these problems we believe to be that of government ownership of public utilities.

But we also submit that the agency which has done the most to "ease the strain on our transportation facilities" is the motor truck. Where good or even passable roads exist the truck has amply demonstrated its usefulness. It has saved the situation many times during the past months, making good not only on short hauls, where it was expected to, but also in long-haul work.

Highway transportation by truck is no longer a theory. It is a condition. It was sure to come, war or no war, but the war has given it an impetus that will carry it far.

And to enhance its efficiency, to extend its utility and bring down its cost, more and better roads must be provided. More roads will have to be built to render accessible large areas not now within reach of markets. Better roads will have to be built to carry the heavier, denser traffic.

Radical changes in the design of motor trucks do not seem likely, but minor modifications whose cumulative effects may materially change the motor-driven vehicle are not to be regarded as impossible or even improbable. Some of these changes will undoubtedly tend to make the vehicle more destructive to the roads; others will doubtless have the

opposite tendency. These developments cannot be foreseen, but they can be provided for in a measure by building roads with a factor of safety great enough to take care of any reasonable changes in character or weight of motor vehicles.

Restrictive legislation on wheel loads and total weights has been resorted to and may have to be invoked further, but such regulatory action should be approached with caution. It is seldom wise to attempt to restrict or limit natural development.

The motor vehicle as a means of passenger and freight transportation has come and come to stay. In a way it is a war measure, but it will remain after the war has ended as a potent factor in the nation's progress in the coming peaceful years.

When the futility of government ownership and operation has been as thoroughly demonstrated in the carrying of passengers and freight as it has in carrying mail the private owners of the railroads may have turned back to them properties that will encounter very real competition from motor vehicles operated over the country's public roads.

In the meantime road builders must make provision against that day when highway traffic will be of much greater volume than it is now.

Road Work in Merced County, California

Present Plans Contemplate Expenditure of \$1,750,000 from Bonds and Taxation

Extensive road improvements have been planned by the Board of Supervisors of Merced County, California, and plans have been drawn up by County Surveyor A. C. Cowell and approved by Senior Highway Engineer W. H. Lynch of the Office of Public Roads and Rural Engineering.

The present plans call for a system of concrete roads to be built at an estimated cost of \$1,750,000. The funds are to be derived from the proceeds of bond issues and from funds secured by direct tax levies. The new roads will serve a part of the productive San Joaquin Valley.

Oklahoma Contracts Awarded

State Highway Commission Lets Contracts for Roads and for the Oklahoma City-New Castle Bridge

The Oklahoma Highway Department has awarded a contract for the Oklahoma City-New Castle Bridge to Olson-Magee & Co. of Kansas City, Mo. The estimated cost of the work is \$202,832.06, and it has been under consideration for a number of years.

The company bid on only \$175,000 worth of the work, the performance of the remainder being contingent upon the raising of additional funds by the state. Of the \$175,000 the Federal Government will furnish \$50,000, the state, \$50,000; Oklahoma County, \$50,000; Grady County, \$20,000 and Kiowa County, \$5,000.

Another contract awarded was for the construction of an "object lesson" pavement on East 23d St., at Oklahoma City. The pavement will be 2 mi. long and will be built with four different kinds of materials. The contract for the construction of the brick, concrete and macadam sections was awarded to M. A. Swatek & Co. of Oklahoma City for \$26,000, while the Western Paving Co., also of Oklahoma City, was awarded the contract for the construction of a section of bituminous paving at \$21,000. The cost of the work is to be borne by the Federal Government, the state and Oklahoma County, the Government and the state each paying \$21,000 and Oklahoma County the difference.

A contract for the construction of 2.68 mi. of cement concrete pavement between Lawton and the south line of the Fort Sill military reservation was awarded to the Western

Paving Co. at \$48,111. One-half of the cost is to be paid by the Government and one-half by the state.

A contract for the construction of a 16-mi. water-bound macadam road in Bryan County, from Durant to the north county line, was awarded to P. Y. Walker of Oklahoma City at \$110,000. The contract for building a 1-mi. section of macadam and two sections of concrete, each $\frac{1}{2}$ mi. long, was awarded to M. A. Swatek & Co. for \$26,000, the entire cost to be borne by the state.

Indianapolis Refused Street Oil

Request of Indiana City Street Officials Refused by the Fuel Administration

The Federal Fuel Administration has refused the request of the street officials of the city of Indianapolis, Ind., for oil to lay the dust on unimproved streets, according to recent advices from that city.

The city needed 600,000 gal. of oil for this work and made contracts for it last March, and efforts have since been made to secure the shipment of the oil. The city officials were unsuccessful, however, and Corporation Counsel Samuel Ashby recently visited Washington in an attempt to secure the desired material. The request was refused, although the city was allowed sufficient asphalt to meet its needs for repair work.

The asphalt released to the city will be sufficient, it is stated, to complete the paving of sections of Eastern Ave., Kenwood Ave., Michigan St., and St. Clair St. It is also hoped that further releases of asphalt will make possible the completion of pavements on North Illinois St. and Belmont Ave.

Grange Against Pennsylvania Road Bonds

Preparations Being Made for an Active Campaign to Defeat the Proposed \$50,000,000 Issue

The Pennsylvania State Grange is preparing to carry on an active campaign against the proposed \$50,000,000 road bond issue which will be voted on at the next election, according to advices from Harrisburg. The grange is traditionally hostile to the bond issue movement, and was largely instrumental in defeating the proposal several years ago. The following extract from a recent issue of "Grange News" outlines the organization's position:

"Besides, there is the unprecedented scarcity and high cost of labor staring us in the face. If it would be unpatriotic for the state to compete with the National Government in the matter of finance it would be equally unpatriotic to compete for labor and materials.

"The State Highway Department, while unhindered by reason of a lack of funds, has difficulty in securing sufficient labor and materials to keep the roads we now have in repair, in addition to building such new roads as contribute directly to the success of our military efforts.

"Deducting the amount provided for township dirt roads the last Legislature appropriated \$14,000,000 to the highway department for construction, in addition to the general salary and traveling expense fund of more than \$500,000 that was made available.

"With the exercise of proper foresight the next Legislature can afford to be equally liberal with the highway department, and the money thus appropriated will serve to keep our roads in as good condition as at present, which is about all we can expect until the return of peace.

"We all want good roads, but for the time being we must make the best of what we have. With the return of normal conditions we will find a way of building improved highways and paying for them out of current revenues."

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Crusher Run

Joseph Ripley, consulting engineer of the State Engineer, has resigned to accept the position of Chief Engineer to a great project in the Province of Shantung, China.

Edwin Duffey, Commissioner of Highways of New York State, was among the guests and speakers at the semi-annual meeting of the New York State Automobile Association held at Middletown, N. Y., the last week in June.

William G. Fox of Saratoga Springs, N. Y., is at present with McArthur Bros. at Chester, Pa. His interest is in the housing proposition, that is, in the construction of houses for the employees of the Chester shipyard; also in double-tracking 6 mi. of railroad between Darby and Chester.

High estimates for June: Road No. 1,422, Rensselaer County, Fred E. Ellis, \$10,803.09; road No. 1,100, Hamilton County, S. B. Van Wagenen, \$9,945.90; road No. 1,159, Ontario County, Greenfield Construction Co., \$7,533.09; road No. 1,045, Saratoga County, Richard Hopkins, \$6,020.55. Nathan E. Young, Joseph Walker, Spellman-Oliver Co., J. B. Dower, Hendrickson-McCabe, Paddelford & King were also in line with good sized monthly estimates.

An appeal was taken before the Appellate Division in the test case of George H. McEvoy brought by the New York State Road Builders' Association against the New York State Highway Department, to determine whether the Walters' law was discretionary or it placed an obligation upon the Highway Commissioner to cancel highway contracts when application was made under the law. Probably no decision will be handed down until the next sitting of the Appellate Division which will be in the month of September.

Paul McCloud, a former employee of the New York State Highway Department, serving as Division Engineer under the administration of C. Gordon Reel, is one of the Americans with the United States Army in France who have been cited for extraordinary bravery under fire, and who received war decorations. Mr. McCloud is now a lieutenant and is connected with an engineering division. The citation states that he showed most wonderful heroism at the battle of Cambrai "in remaining under shell fire until the escape of the British troops, leading them in the trenches and di-

recting the procurement and distribution of the ammunition." He displayed coolness and judgment under fire.

Harry B. Parker, formerly of the New York State Highway Department, is attached to a dirigible base "somewhere in France." Mr. Parker, who is a former student of the Rensselaer Polytechnic Institute in Troy, enlisted in the aviation service of the Navy last year. He is a grandson of the late Professor H. E. Parker, of Dartmouth College, who served as chaplain in the Civil War.

William Ryan Hill, consulting engineer, passed away at his home in Albany, N. Y., on June 17, 1918. His four sons survive him, all of whom are in Government engineering service. Mr. Hill's most excellent work when he supervised the construction of the Syracuse water works system gained him great recognition, the system being acknowledged a master work. After 10 years in the service of Syracuse as an official of the Engineering Bureau, he was appointed State Engineer for the construction of the Barge Canal.

The New York State Highway Department need not blush for its officials in this war crisis. The rosters of the cantonments in the United States and those of the American Expeditionary Forces "over there" have on them many names of the highway employees who have enlisted or who have been selected by the draft to fight for their country. They have also to their credit, a large proportionate quota of first, second and third Liberty Loan bonds and are also boosting the war savings stamps, thinking them a splendid medium to save in small amounts.

One of the inducements offered to the Government to take over the Helderberg Inn at Altamont, N. Y., as a convalescent hospital, has been the admirable transfer advantages due to the fact that the trip from the stations or the docks to the hospital could be made by motor ambulances over excellent state highways. Physicians say that the climatic conditions of this locality are ideal for the purpose intended. The fact that the Adirondacks have been found to be undesirable for the peculiar diseases of the throat brought about by gassing makes this an enviable location for a sanatorium.

(Continued on page 27.)



Massachusetts Highway Association

Founded 1893

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Announcement

This section of the paper is open to members of the Massachusetts Highway Association for the discussion of matters directly connected with road interests. Members are requested to submit items of interest for use in this column.

Address all communications to GOOD ROADS, P. O. Box 2613, Boston.

The midsummer outing of the Massachusetts Highway Association will be held on the second Thursday in August and it is expected that the City of Boston will offer the organization the use of one of the city steamers for a trip down the harbor. The matter will come up at the next meeting of the Board of Governors.

On June 6 a special committee appointed by the M. H. A. addressed a letter to the Director of the U. S. Office of Public Roads inquiring for information regarding the operation of the regulations controlling the use of bituminous road materials and asking for advice as to where such material could be procured. The following letter is Mr. Logan Waller Page's reply to the communication:

United States Department of Agriculture
Office of Public Roads and Rural Engineering
Washington, D. C.

June 15, 1918.

Mr. John N. Keyes, President, State Highway Association,
Boston, Mass.

Dear Sir—I have your letter of June 6, 1918, relative to sources of supply of bituminous road material for maintenance and repair of principal roads in Massachusetts, and in reply it is suggested that the material should be obtained from various sources if possible, in order to avoid conflict with the requirements of the army and navy, our allies and our war industries. However, should you meet with difficulty in securing acceptance of your orders communication should be had with Mr. C. G. Sheffield, Asst. to Director, Oil Division, U. S. Fuel Administration, Washington, D. C., who will endeavor to place your orders.

Very truly yours,

(Signed) L. W. PAGE,

Chairman of Committee.

News and Gossip

James B. Shea, who has for many years been a member of the M. H. A., has finally received proper acknowledgment for his long and efficient service and has been appointed by Mayor Peters to be chairman of the Boston Park Commission.

Mr. Shea first entered the employ of the Park Department as a clerk in 1891; later he was rated as general foreman. In 1901 he was promoted to be Assistant Superintendent; in 1912 to be Superintendent, and upon the consoli-

dation of the four city departments he was appointed Deputy Commissioner.

No one could be better qualified to fill his new position and it is no more than a fitting reward for faithful service well done.



HON. JAMES W. SYNAN,
Massachusetts State Highway
Commissioner.

Walsh, and we hope he will be continued in his present office as long as he is willing to serve the state.

Robert P. Marsh, a former alderman, has been elected to fill the office of Superintendent of Streets and Engineering of Springfield, Mass. The election followed one of the warmest sessions that the council has ever held. The election is for five years at a salary of \$4,000 per annum.

Arthur H. Woodward, who has been acting as superintendent, declined to allow his name to be used, preferring to remain in his old position as assistant superintendent.

Hundreds of Boston streets, accustomed to an oil surface in summer, must remain dusty this year. The City of Boston can get scarcely one-fifth of the normal supply of non-asphaltic oil and hardly any tar, owing to the severe Government regulations.

The city uses in normal times from 700,000 to 1,000,000 gal. of oil each year, and the price has been approximately 8 ct. So far this year the city has been able to purchase 127,000 gal. at a price of 13½ ct., all oil being non-asphaltic.

Naturally, in view of this tremendous shortage, extreme care must be used in the distribution. When a carload of oil is received the Public Works Department sends to the

The best news that has come to us for a long time is the reappointment of State Highway Commissioner Synan. Mr. Synan is one of the hardest working members of the board, is approachable and always ready to answer inquiries. He is one of the best friends of the automobilists and it would have been a serious mistake if Governor McCall had not retained the services of such an efficient public official.

Commissioner Synan was appointed to the highway board by Governor Foss in 1912 and was later reappointed in 1915 by Governor

Massachusetts Highway Commission a list of streets it desires to treat, stating the reason for oiling each street. The commission passes upon the applications and forwards the papers to the Director of the U. S. Office of Public Roads for final approval.

The \$250,000 appropriated for the Lake Quinsigamond bridge is not enough to complete the work and \$75,000 more is needed. The City of Worcester will petition the Legislature for the additional sum after a conference with the officials of the town of Shrewsbury.

The bridge should be completed during the summer and will afford straightaway racing on Lake Quinsigamond as well as making automobile travel on the road to Boston much better.

Mayor Peters has issued an important order, "Circular No. 11," reversing the policy heretofore in effect concerning the entry of city employees into Government service. He directs that "from this date no leave of absence shall be granted to a city employee desiring to enter the Government service at a salary in excess of that paid him by the city. This order does not, of course, apply to those entering the military or naval service of the country."

The mayor rehearses the fact that a number of employees have been already granted such temporary leave of absence, "the city holding their positions open for them until their return." But he adds: "It is not necessary to point out that such a practice is unfair to the department and the temporary employee."

While the new order does not affect the military or naval service, it will affect all who henceforth may enter the Red Cross, Y. M. C. A., K. of C., or other humanitarian or war relief work.

A Boston man who is an authority on the Indian language gives an interesting account of the origin of the word "Massachusetts."

It is derived from the name given by the Indians to two small islands somewhere off the coast and was originally "na-massachusetts," "na-massa," which means fishing and "chu" meaning island.

The labor unions are strongly agitating measures to help relieve the possible surplus of workmen at the close of the war. The proposal now most favored is a 6-hour day for six days in the week, or a 5½-day week with double time for any work in excess of 4 hours on Saturday.

At a hearing before the U. S. Engineers on the petition regarding the width of the draw in the temporary bridge over the Neponset River, it was decided that the wider draw of 45 ft., as advocated by the Dorchester Board of Trade and argued for by Daniel T. O'Connell, their representative at the conference, would be the one constructed.

The Metropolitan Park Commissioners in their original estimate provided for a draw 38 ft. 6 in. wide, but as the draw at Granite Ave. is 50 ft. wide and the American Shipbuilding & Transportation Co. has contracts for boats of 38 ft. beam, it was obvious to those concerned that a narrow draw would handicap, if not entirely prevent, shipbuilding work in a large area up the river.

The U. S. Engineers decided that the wider draw was the obvious thing to recommend and forthwith decided.

Because of the war the triennial road census in Massachusetts will not be taken this year, the Highway Commission, which has had charge of this work every three years since 1909, having decided that it would be unpatriotic to use for this purpose the services of a large number of people

who can be employed to the greater advantage of the nation in work of other character. The commission's regular force has been so depleted by the enlistment of a great many of its engineers that it is not in such shape that it could properly supervise the census even if it were thought best to make the count.

In the census taken in 1915 the count was made at 192 stations scattered all over the commonwealth. It was carried on for a week in August and for another week in October. The same plan was followed in 1909 and in 1912, though in 1909 there were 238 stations and in 1912 only 156. To make the count this year would require the services of nearly 200 enumerators for a week in the midst of the farm production season, and it would take that number of people from other pursuits. The commission does not believe that it is justified, even by the importance of the census to road engineering, to seek that amount of labor. In addition a large force is needed to check up at various counting points the work of the enumerators, and another large force to do the tabulating in the office after the results have been turned in from the different stations.

To take a road census costs about \$10,000, but it is not so much the money—which is considered an excellent investment under usual conditions and even a necessary one—as it is the inability to secure the census force without interfering with war work, that has led the commission to decide to omit the census this year. It may be that if conditions change, the census will be taken next year or it may go over until such time as there is a less urgent call for labor.

William L. Dickinson, one of the organizers and a former president of the Massachusetts Highway Association, for 11 years prior to 1900 Superintendent of Highways in the City of Springfield, and generally considered an authority on highway construction, died on July 4 in his home at Springfield, aged 69. He was a native of Springfield and was largely instrumental in bettering the highway conditions in this part of the state.

Mr. Dickinson was born July 1, 1852, the son of Isaac Dickinson, for many years a market gardener in the Forest Park section.

The years of his early manhood were spent in his father's market garden, where he obtained a thorough knowledge of business principles and laid a sound foundation for his future life. The market garden was entirely given up in 1888 and almost immediately he entered upon a public career of great usefulness. A Republican, as was his father before him, in 1882 he was elected a member of the Republican City Committee, which, in those days, comprised only eight members. He continued a member of this committee until 1886 when he was elected to represent his ward—then Ward 6—in the Common Council. This office he held one year and during that time he served on the board of supervisors and the pauper department committee.

In 1887 and '88 he served on the Board of Aldermen, and while filling this office was a member of the committee on highways and bridges, and the fire department committee.

It was in February, 1889, that he was elected Superintendent of Streets, which position he filled nearly 11 years, resigning Nov. 29, 1899. When Mr. Dickinson entered this office the city was badly off for want of up-to-date machinery for the construction and maintenance of good roads, and the Street Department system was defective. He entered into the work with an interest and an enthusiasm which characterized all his efforts and very shortly he succeeded in reorganizing the system.

Through his earnest recommendation a steam roller and all the other necessary improved machinery was purchased by the city. Everything was handled in an economical man-

(Continued on page 28.)



New Hampshire Good Roads Association

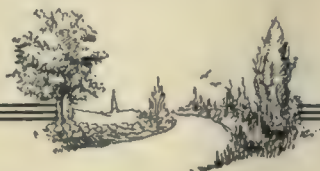


OFFICERS FOR 1918

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Due to the absence of our special correspondent, Acting Mess Sergeant J. E. McGuire, who is now busily preparing chow for Battery A, 11th Battalion, at Camp Jackson, we are indebted to "The Keene Sentinel" reporters for the following:

"The New Hampshire Good Roads Association held a large and successful quarterly meeting in Keene Thursday with a business session at 11:30 and a trip around Keene by auto. A feature of special interest to many was a visit to the extensive nurseries of the Keene Forestry Association where millions of pines, spruces, etc., are being cultivated. A banquet was served at the Cheshire House, attended by His Excellency Governor Keyes, and several state and municipal officers, at which over one hundred members sat down.

"At the last meeting of the association at Nashua, Keene sent a delegation and a large list of new members and invited the association here for its next meeting. The town of Lebanon, which has a lot of enthusiastic good roads workers, took notice of this and outdid Keene on Thursday, sending down a delegation of over fifty and adding about the same number to the association membership. A cordial invitation to hold its September meeting in Lebanon was accepted by the association.

"President Charles A. French of Laconia, for a short time located in Keene as a State Highway Engineer, presided at the business session, at which over fifty were present. Clerk George P. Winn of Nashua read the records, which were approved, and the voting in of new members, acceptance of the Lebanon invitation, etc., followed. Commissioner F. E. Everett, chairman of the By-Laws Committee, then and later submitted amendments providing for the election, subsequently, of a secretary-treasurer instead of two officers, and for a nominating committee; also making the dues at the rate of \$2 a year for active or associate members. The amendments were adopted.

"Autos were at hand to take the members to the Forestry Association nurseries and thence to South Keene, Wheelock Park, etc. The methods of planting, transplanting, care and cultivation of seedlings, etc., and the examination of the beds of seedlings and transplants, covering several acres, were explained by Forester Proell and others who could do so, the industry being a new one to many of the visitors.

"The dinner at the Cheshire House was a very successful feature of the meeting, both because of the bountiful and delicious banquet provided by Landlord Reynolds and the speaking that followed on the subject of road improvements and conditions as they are today. Music during the

dinner was provided by the Keene high school orchestra, and if there is anything in the way of new popular music and songs that these boys cannot play a la McEnelley, it is not recalled. They were frequently and loudly applauded. The bill of fare comprised the following:

Tomato Soup	
Olives	
Halibut au Gratin	
Cucumbers	
Roast Sirloin of Beef	
Baked, Mashed Potatoes	Spinach
Tomato Salad	
Strawberry Shortcake	
Crackers	Cheese
Cigars	Coffee Cigarets

"In calling the members to order as cigars were lighted, President French, on behalf of the association, thanked the Keene members and citizens and friends for their hospitality and expressed the appreciation of the visitors. He also read a list of eight associate members, including Major O. E. Cain of Keene, who were now in service in France.

"Mayor George H. Eames extended a cordial welcome to the visitors on behalf of the City of Keene. He believed in the principle of getting road builders together, as this association is doing, such meetings resulting in an interchange of ideas and experiences profitable to all. He hoped the association would find its welcome here a cordial one and would visit Keene again.

"The members rose and cheered for some time when Governor Keyes was presented. The governor expressed his thanks, assured his hearers that he was always ready to attend a good roads association meeting and congratulated the association on its acquisition from Grafton County. He anticipated that the enthusiasm of the Lebanon men would lead to the early completion of the road from Concord. He liked to think of what a live good roads organization can do when the Legislature convenes to help road improvements. This state will make no mistake if it keeps on with its program of construction that has already accomplished so much. In this connection the speaker suggested that these things be taken up:

"First, the elimination of bad curves; second, that the state should take over the bridges and bear the entire expense thereof—it is not fair to throw all the cost on the towns; third, he thought a uniform style and system of standard guide boards should be adopted. It is important to place before the eye of every traveler the information about roads and towns which he wants to know. The governor closed by reading an inspiring story from a Michigan re-

port setting forth in concise form the reasons why roads rule the world.

"Mayor Holmes of Worcester was the next speaker and he, too, turned out to be an enthusiastic 'good roads' man, ready to make sacrifices to attend road meetings. It is by getting together that a spirit which accomplishes things is created. New Hampshire furnishes his city her best road material, granite blocks, because they are the most durable. Other types of roads in that city were referred to, as was the great task foremost before the people today, 'to lick the Kaiser.' He feared there were still a lot of men who do not appreciate what war means and urged that the people get after them. He spoke complementarily of the large quota that Keene has sent into the service.

"Capt. E. S. B. Warner, 301st Engineers, Camp Devens, was warmly welcomed. He said he was glad to be at the meeting among men whose business is construction, as his branch of engineering lay directly in that line. The officers of his corps are road, bridge, trench or emplacement builders, as requirements may dictate, and the men are all specialists in the trades involved in such constructive work. He had recently had the pleasure of a motor trip through New Hampshire and her glorious mountains and over her wonderful gravel roads which he had never seen anything like. And he had been especially impressed with the efficiency and excellence of the New Hampshire patrol system that puts every patrolled road in order at once after a rain—something he had for a long time hoped to see accomplished. Capt. Warner also spoke of the large numbers of service flags he saw in house after house as he toured this state, showing conclusively the patriotic spirit of the people, and went on to explain in an interesting manner work that the engineers' corps, whose insignia is a castle on the coat collar, is trained to do in the army. The captain was heard with especial pleasure and loudly applauded.

"Mayor Crowley of Nashua referred to the really close proximity of Keene and Nashua today because of the fine road practically completed, except in Dublin, and of the good work done by the State Highway Department. Lines of communication in the eastern part of the state seemed to him to be particularly defective, but he hoped, through cooperation such as this association represents, to see better conditions everywhere.

"Commissioner F. E. Everett spoke of the handicap his department is working under because of war conditions and prices and the impossibility of getting men and teams. He was glad to say he had just got word the federal authorities were to allow a shipment of road oils to make possible the maintenance of roads greatly needing it, and told about an experiment with the labor of prisoners from jails, etc., that the department is trying on the Mooslaue Road in Benton. He could not get prison labor because that is contracted for until 1920 and found very little obtainable at county farms, largely because of prohibition, it was said. The men going to Benton from certain jails do so voluntarily and will be placed on their honor and be well fed and housed and will get a share of what they earn.

"In the matter of legislative endeavor, the attention of the meeting was called to the need of creating a sentiment towards the better protection of teams and motorists at night by changing the law so that teams as well as motors must carry a visible light or lights. At present the law as to teams excepts lighted areas, and it has been found that in the average lighted street a team without a light is frequently not seen and is as much a source and object of danger as it would be on the road, while with a lantern it would be instantly seen, usually a long way ahead. The new rules that automobile headlights shall throw their rays down low tends to increase the danger of teams very much on the road because the headlight rays are projected largely below the wagon load or body."

Crusher Run

(Continued from page 23.)

John J. O'Hara, employed in the New York State Highway Department, has been accepted at the United States Army, Navy and Marine Corps recruiting station as landsman for machinist's mate, aviation. Mr. O'Hara is the son of John J. O'Hara, a well known civil engineer.

Great credit is to be given to New York State troopers who patrol the highways where speed drivers had a riotous time before their appearance on the roads. Notwithstanding the fact that there is more traffic over the highways, automobile accidents have been decreased on state roads by almost two-thirds.

Slow driving between the Hamilton County line and Long Lake on account of repair work is one of the new warnings announced by the State Commissioner of Highways, Edwin Duffey. Between Albany and New York, on the west side, is a narrow dirt clay detour between Athens and Cossackie, and repairs are in progress 1 mi. north of Newburgh.

Messrs. Harper & Higginson, Inc., Newburgh, N. Y., and Antonio Colorusso, Hudson, N. Y., have become members of the New York State Road Builders' Association. This association is the one official organization of contractors building roads in New York State. Any reforms which have been brought about in the road building game have been instituted by it.

Capt. Henry E. Mosher who was killed in action on the western front in France, was for four years immediately prior to entering service, connected with the Rochester Division of the New York State Department of Highways. After his enlistment as a private he was commissioned a first lieutenant and later was promoted to a captaincy and attached to the staff of General Pershing.

Highway materials have been placed next to coal, coke and ore on the preferential list for supply by the car service section of the Railroad Administration of the United States Government. This ruling applies particularly to stone, sand and gravel for maintenance and essential road construction. The aim is to assure the proper care of roads already built, and the construction of those necessary for the carrying on of the war.

General Manager John H. Gordon, one of the officials in charge of the construction of Government storehouses at South Schenectady, has announced that the second of six warehouses being erected there will be turned over to the Government this month. The Feeny & Sheehan Building Co. states that the work is moving smoothly and that materials are being received in adequate allotments. Mr. Gordon is president of the New York State Road Builders' Association.

William H. Breen, who for the past 10 years has been engineer of construction for the State Highway Department at Plattsburgh, N. Y., has resigned his position with the state. Since 1909, he has been engaged as supervisor of construction on about all the state roads running into Plattsburgh. He is one of the best known men in Clinton County and his thorough knowledge of road building is responsible for many of the fine roads which the state has built in the vicinity of Plattsburgh. Mr. Breen's innate modesty has always prevented him from remarking it himself, but outsiders who are in a position to know, state that his percentage is the highest of any man in his line in the State Highway Department.

News and Gossip

(Continued from page 25.)

ner and without any inordinate or injudicious expenditures the city was finely equipped not only to build good roads, but also to keep them in first class order. Mr. Dickinson did not sit in his office, but traveled all over the country cultivating the acquaintance of the highest authorities on road construction and studying the methods in vogue in the countries of Europe where at that time road building was greatly in advance of anything done in the United States.

The steam roller had not been in use more than a year when it was acknowledged even by his opponents that the city had saved several thousand dollars and that the city had gained a prestige for level roads throughout the state. Only a few years before that time it had been the custom for the local authorities to go to Hartford to see what could be accomplished in the line of street improvements. Soon the down-river neighbors began to make frequent visits to Springfield to learn a lesson. A new street sweeper contributed to improvement in the cleaning of the streets.

Each year equal progress was made. After five years of Mr. Dickinson's superintendency the Street Department was regarded as a model for other cities to copy and the chairman of the State Highway Commission acknowledged that it was a wonderfully efficient and up-to-date department.

Not long after he had entered into the work of street improvement he, with others in like position, saw the necessity for an organization which should contain men from the different towns and cities in the state who desired to co-operate in the cause of good roads. Some time later the Massachusetts State Highway Association was organized and Mr. Dickinson held office in this body many years. He was first a director, but in February, 1895, he was elected president, which position he held one year. In 1896 he was elected treasurer and held the office for three years. Many addresses and papers which he prepared for the meetings of this organization were widely disseminated by the press and several are regarded as authoritative treatises. Mr. Dickinson was the founder of the Connecticut Valley Highway Association which was organized April 3, 1896. He was, during its entire existence, president.

PERSONAL MENTION

T. H. Landon, City Engineer of Alton, Ill., is to enter the Coast Artillery, according to a recent report.

A. V. Gibson, of Kalispell, Mont., has been appointed a member of the State Highway Commission of that state.

Harry A. Rager has resigned as Chief Bridge Engineer of the Utah State Highway Commission, and has enlisted in the 473d Engineers.

Harry L. Shaner has resigned as City Engineer of Lynchburg, Va., to become Chief Engineer of the John B. McKinney Co. of Lee Hall, Va.

C. E. Henderson has resigned as County Engineer of St. Johns County, Florida, to enter Government service in the Bureau of Industrial Housing and Transportation.

William S. Moore has resigned as State Highway Engineer of Indiana as the result of the legal proceedings involving the constitutionality of the state highway law.

A. W. Campbell, formerly Deputy Minister of Railways and Canals of Ontario, is expected to be given an important post in connection with a plan for the improvement of the highways of the province by the Federal Government.

MEETINGS

Calendar of Coming Meetings

Aug. 7-9—North Carolina Good Roads Association.—Annual convention, Wilmington, N. C. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

American Association of State Highway Officials

A meeting of the Executive Committee of the American Association of State Highway Officials, officers and directors of the Highway Industries Association and other interested parties was held at the Office of Public Roads and Rural Engineering, Washington, D. C., on Wednesday, July 10.

The meeting was called for the purpose of considering the advance in freight rates made by Order 28 of the Director-General of Railroads, and after a thorough discussion a committee was appointed to draft a resolution asking for a reduction in the rates on road building materials. The committee prepared a resolution which was presented to the meeting and adopted. The meeting instructed the committee to present it, with an appeal, to the committee appointed by the Director-General of Railroads to consider such matters. This was done on July 11, and after a long discussion, Chairman Walters of the committee stated that the Railroad Administration could not give any relief to contractors who had taken contracts prior to the advance in freight rates, and that no distinction could be made between contractors holding contracts executed prior to the date of increase and those holding contracts executed after that date.

The resolution and appeal characterized the increase of rates as undue and unjust as compared with the increased transportation cost, and requested that the order be so modified as to apply a straight increase of 25% on road building materials. It also urged that refunds be made on all charges in excess of 25% above the previous rates on all shipments made subsequent to June 24. The petition was signed by Paul D. Sargent, Acting Chairman, and A. D. Williams, Acting Secretary, American Association of State Highway Officials; H. G. Shirley, Secretary of the Highway Industries Association; A. N. Johnson, Chief Consulting Highway Engineer of the Portland Cement Association; W. P. Blair, Secretary of the National Paving Brick Association; A. P. Sandles, Secretary of the National Crushed Stone Association; H. J. Love, Secretary of the National Slag Association; E. G. Sutton, Secretary of the National Association of Sand and Gravel Producers, and E. J. Morrison, President of the National Association of Asphalt Block Manufacturers.

The Central Mississippi Valley Division of the National Safety Council will meet at St. Louis, Mo., during the week of Sept. 30. The organization will meet in sections and it is expected that one section meeting will be set aside for the discussion of road accidents and their prevention. A "safety week" for St. Louis and the surrounding cities has been planned in connection with the meeting, its object being to make the week of the convention free from accidents.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, JULY 27, 1918

Number
4

The Prevention of Accidents at Grade Crossings*

By C. L. ADDISON†.

Grade crossing protection is a problem to which the Long Island Railroad Company has given great attention. The subject itself is as old as the railroads, but it was not until the advent of the motor-driven vehicle that it commenced to assume a phase which has become more and more acute year by year.

Before going into the means employed to make grade crossings reasonably safe—and I say reasonably safe since no grade crossing is absolutely so—it might be well to say a few words on the subject of a correlated matter; namely,

*Paper presented at the ninth annual Conference of Mayors and Other City Officials of the State of New York, Newburgh, N. Y., June 11-13, 1918.

†Assistant to the President, Long Island Railroad Company, New York, N. Y.

the elimination of grade crossings, since the progress made along the line of the second subject materially decreases the importance of the first.

The subject of the gradual elimination of grade crossings by the substitution of under or over crossings did not receive serious consideration, nor was it treated as a state matter, in this state, prior to 1897. Our neighbors, particularly the State of Massachusetts, more alive to the seriousness of the state grade crossing situation, had previously enacted legislation affecting these matters and had made considerable progress.

During the session of 1897 what was known as the Grade Crossing Law was enacted. The important features of this law may be summarized as follows:

1.—It placed in the hands of the Railroad Commission and



WARNING SIGN, 60 FT. LONG, ON A BRIDGE OF THE LONG ISLAND RAILROAD AT FLUSHING, NEW YORK CITY.
ONE OF A NUMBER PUT UP IN THE RAILROAD'S SAFETY CAMPAIGN.

later in the hands of its successors, the Public Service Commissions, the absolute power of determining the manner in which new highways should cross existing railroads; also the manner in which new railroads should cross existing highways. This is a most important feature of the law, since it prevents an indiscriminate creation of new crossings by either village, city or other sub-divisions, which had been accustomed at will to open new highways across railroad tracks, and was particularly important so far as the Long Island Railroad was concerned, as innumerable real estate developments were creating situations of this character. While I have not the figures before me, I think it would be safe to state, without fear of contradiction, that in the past 20 years, since the passage of this law, the number of crossings by new highways at grade in the State of New York has been so small as to be almost negligible.

2.—It empowered the same commissions to order, after hearing, the elimination of the existing grade crossings, either by the substitution of an overhead or an undergrade crossing, as the physical features might suggest, or combining a crossing with another crossing by the construction of short pieces of highway.

3.—It provided a means of defraying the expense of these eliminations by assessing one-half of the cost on the railroad company, one-quarter on the political sub-division having jurisdiction over the highway in question, and one-quarter on the state.

In 1898 there were 8,849 crossings in the State of New York, and since that time 646 have been eliminated under the before mentioned and other laws, while in other ways 260 additional crossings have been eliminated, a total of 906.

It would seem that 906 of a total of 8,849 crossings is not a very large proportion to eliminate, but when it is kept in mind that the 906 crossings which have been eliminated represent those which had been intensively used and were particularly dangerous the results have been far better than would appear from the figures. However, the state has not been particularly liberal in the matter of appropriations for this work, less than three millions of dollars, or about \$150,000 per year, having been spent in the 20-year period.

Coming now to the Long Island Railroad we find ourselves in the front rank in the matter of grade eliminations.

Under certain special acts of the Legislature, known as the Atlantic Avenue Improvement Act and the Bay Ridge Improvement Act, about 130 grade crossings have been eliminated in the City of New York since 1897, and during the same period, under the Grade Crossing Law, agreements with the municipality or at the sole expense of the railroad company, about 120 additional crossings have been eliminated, making a total of 250 crossings, over 200 of which were within the limits of the City of New York. It would seem from these figures that 250 crossings was a large proportion of the 906 crossings eliminated under the state's supervision and that we have secured more than our share of the state funds. This, however, is not so, since only 42 of the 250 eliminations on Long Island were carried out under the so-called Grade Crossing Law, the major portion, 130, having been done under special acts, under which the expense was borne jointly by the railroad company and the City of New York, the state in no way participating in the expense.

As our eliminations were largely within the city and necessitated the entire rebuilding of the railroad through sections the cost has been very high, the work having cost to date approximately \$15,000,000. Arrangements had been made through the Public Service Commissions for the elimination of some 15 additional crossings at an additional cost of \$2,300,000 during 1917 and 1918, but the unfortunate condition in which we find our country at the present time

made it necessary to indefinitely postpone the carrying out of this program. So much for the grade elimination feature.

Notwithstanding the large number of crossings which have been made absolutely safe by this process of elimination at a cost of \$15,000,000, we are still confronted on Long Island with the extremely serious problem of 621 grade crossings, many of which are intensively used. Of these 621 crossings 244 are protected by flagmen or flagmen and gates, and about 70 by electric alarm devices, leaving 307 so-called unprotected crossings.

Our conditions on Long Island are rather unusual. Lying as we do at the very doors of Manhattan and containing the Boroughs of Brooklyn and Queens it has been the logical field for motor vehicle activity and our troubles started at an early date since Long Island counties were among the first in the state to initiate the construction of good roads.

To give you some idea of the volume of vehicular traffic, I will say that as far back as 1914 or 1915 a count for a period of time showed that over 9,000 automobiles passed the intersection of Hoffman Boulevard and Hillside Avenue near the old village of Jamaica every day, and that over 8,000 automobiles came to Long Island over the Queensborough Bridge and over 5,000 by way of the Williamsburgh Bridge. At that time there were 78,000 automobiles owned by residents of New York City alone, and taking the number that passed the intersection of Hoffman Boulevard and Hillside Avenue, it meant that 15% of the total number of automobiles in New York City crossed over the tracks of the Long Island Railroad at grade at least once or twice during the day. At Smith Street, Jamaica, a highway connecting the main highway from New York via the Queensborough Bridge with the south side roads, a count in August last between 7 a.m. and 7 p.m. revealed the fact that 6,000 vehicles crossed our four-track railroad in the period, or at the rate of 500 per hour, or 8 per minute, and these over tracks where about 250 trains passed during the same period.

This intense traffic which was constantly increasing, created a situation which had to be met, and our people conceived the idea of meeting it along certain psychological lines. There is a small percentage of automobile drivers, particularly among the professional class, who seem to have been born with the idea that a public highway was created and is maintained for their particular private use, and they treat a grade crossing with precisely the same indifference with which they treat the rights of other drivers on the highways. Psychologically you cannot meet a driver of this kind; some other means are necessary, as I will point out later.

But, on the other hand, a very large proportion of drivers of motor vehicles, while not obsessed as the class mentioned, do carry strong convictions that unless a railroad train is actually passing over a crossing one won't pass in the next 24 hours, and this is entirely due to the fact that they lose track of the element of danger which is necessarily present at any grade crossing. Instead of assuming that a grade crossing is a dangerous place until it is proven safe, they assume it to be safe until it is proven dangerous, and it is unfortunate that they frequently furnish the proof themselves.

It was to reach these particular people that the campaign of publicity was launched in 1915 when the general manager of this company personally visited the editors of some 30 leading newspapers in Greater New York and laid before them the plan of the campaign and solicited their aid. That same afternoon the first copy, which turned out to be a series of newspaper articles, was dispatched to all papers, and the following morning's dailies showed that the seed sown by the personal visit the previous day was going to bring good results. From that day to this, the papers have

beer backing us in the campaign, and it is only fair to say that without their co-operation we could not have succeeded.

Together with the furnishing of news articles, a series of advertisements was started in groups of papers rotating daily or weekly according to the publication, the advertisements carrying short pungent warnings, suggestions, etc., with a heavy border to attract attention.

In addition to these news articles and advertisements, series of colored cards were prepared showing grade crossing situations, vehicles running through gates, people dodging under gates, and kindred subjects, these cards being placed in the advertising racks of all our own passenger cars and furnished to outside trolley companies for posting in their cars.

Sets were also furnished clubs, department stores, colleges, schools, libraries, banks, insurance companies and other lines of business, largely at their own request, as they desired to help us in the campaign.

Lantern slides displaying a warning were also prepared and placed with the various moving picture theaters on Long Island, and were shown daily and nightly.

were dangerous places, and that if they would stop! look! and listen! they would probably save their lives. We made them realize that there were grade crossings—something they never did before.

We know that good results have been obtained through this campaign which it would be almost impossible to state in the shape of percentages because of the great and unknown increase in the number of automobiles using our highways.

Referring again to the small percentage of drivers previously mentioned, our legal department was very active in prosecuting all cases where automobile drivers ran into gates or ran onto crossings when trains were approaching. The various judges, district attorneys and magistrates in Nassau and Suffolk Counties helped and cooperated. During the year 1915 we prosecuted about 28 cases; the second year 85 cases, many resulting in suspended sentence, but quite a substantial number in fines varying from \$5 to \$50.

Coming now to the more material details of grade crossing protection, there is a form of arm gate generally used throughout the United States with which, undoubtedly, you



WATCHMAN SIGNALING AUTOMOBILES AT A LONG ISLAND RAILROAD GRADE CROSSING.

By this time the various railroad, engineering and automobile publications, not to mention the daily press, all over the country, had been running articles on our campaign.

Another set of posters appealing to chauffeurs and drivers was sent to hotels, road houses, garages, general stores, etc., on Long Island. Through the courtesy of department stores, a gasoline company, and several milk companies, we had the services of their delivery forces to distribute and display our posters on their various routes over Long Island. The telephone company also granted permission to put up the posters on their poles in the vicinity of grade crossings.

As a final touch, numerous signs bearing letters in some instances 3 ft. high, illuminated at night, were placed on bridge structures spanning the main thoroughfares of the island. These signs bear the legend, "This Sign May Save Your Life To-day. All the precautions in the world will not save the lives of those who drive automobiles recklessly over railroad crossings. When approaching a crossing please **Stop, Look & Listen**. We are doing our part. Won't you do yours? Long Island Railroad." "Save Your Lives."

In other words, the campaign had in mind the keeping before the automobile driver at all times, the fact that there were grade crossings on Long Island, that they



ONE OF THE MANY WARNINGS PUT UP BY THE LONG ISLAND RAILROAD IN ITS SAFETY CAMPAIGN.

are all familiar. It had been customary for the various railroad companies to adopt their own standard color. The large proportion used white, but many roads used less conspicuous colors. In some cases the colors were arresting, and in others they were not.

In 1915-16 a committee of the American Railway Association, in conjunction with a committee from the National Association of Railway Commissioners, standardized the painting of these gate arms so that every railroad had precisely the same warnings at railroad crossings. The method of painting was alternate black and white stripes which has high visibility, and being standard on many railroads a driver going from one state to another knows just exactly what it is when he sees it.

Prior to this standardization, flags had been employed by the grade crossing watchman as signals to drivers and others. As many of the drivers complained that they could not tell whether these signals were for them or for the train, a circular disk (with suitable handle) bearing the legend "Stop!" was substituted for the flag at crossings not protected by gates.

To properly take care of such a number of crossings, our organization is necessarily large. We have over 400 crossing watchmen who are organized along police lines, with

roundsmen, whose duty it is to pass over the divisions and see that the crossing watchmen are properly attending to their duties, and other officers to look after the roundsmen to see that they are performing their duties.

In addition, we have special policemen who are located at very important and busy crossings, particularly on Saturdays, Sundays and holidays, whose duty it is to assist the crossing watchman.

Notwithstanding all the precautions taken, a flagman after all is human, with all the human frailties, among which is sleeping on duty at night. It is quite true that on the Long Island Railroad our train movement, in many cases, after midnight is very light, and on a very great proportion of the grade crossings the vehicular traffic is very light also, and it is very difficult under these circumstances at lonely crossings for a man to stay awake.

Inspections reveal the fact that men do sleep on duty and our attention has been very forcibly called to this fact by the Public Service Commission on several occasions, and ways and means to overcome this have been tried. Among these was the introduction of watchmen's clocks which were tried out at the request of the Public Service Commission for the first district. These clocks, as you know, are punched every half hour and indicate the punch mark on the dials, the dials being collected daily by the roundsmen. We were getting very excellent results as far as the dials were concerned, but it was found that the flagmen were surreptitiously using alarm clocks to awake themselves prior to the punching time of the watchmen's clock and our second condition was no better than the first, so we took out the watchmen's clocks.

Another suggestion was to connect up by telephone all grade crossing watchmen's boxes with some central office where the watchmen were to ring up and report at specified periods. The results in this case would have been the same as in the previous case, as the second suggestion had the same infirmity as the first.

We then suggested to the Public Service Commission, and they accepted our suggestion and made an order accordingly, that between the hours of 12 midnight and 5 o'clock in the morning the gates be kept in the down position and raised only to permit vehicles and pedestrians to cross. In making this order, naturally several important crossings where the amount of traffic was material, were omitted. This arrangement has worked very satisfactorily, and has the advantage, at least, of having the crossing protected in the event of the watchman falling asleep. This rule has been in effect since last August and has given excellent results.

This, gentlemen, is about all I have to say on the subject of grade crossing protection as carried out on the Long Island Railroad, but there is one more subject which I think it is proper to introduce at this point.

The crossing sign, as used in the different states of the Union, while varying in design, is placed immediately at the crossing and in the days of horse-driven vehicles gave sufficient warning of an approach to the track. At the present time, however, with the fast moving vehicle the time element has been so reduced that some further warning is necessary and in fairness to motor users should be provided. The importance of this subject was realized by the committees from the American Railway Association and the National Board of Railway Commissioners in 1915, when they adopted a standard approach sign to be placed some 300 ft. from the railroad crossing on either side. The railroad companies have long recognized the necessity of something of this kind but lacked the necessary authority to maintain the suggested signs. Appreciating this fact, the committee before referred to, drafted a bill for introduction in the several Legislatures throughout the United

States making the placing and maintaining of these signs a highway matter.

This bill has been introduced into the Legislature of this state for the last three years and for some unknown reason has met defeat at each session. Considering the importance of giving a suitable warning to the driver of a vehicle that he is approaching a railroad crossing, it seems incomprehensible that legislation of this kind, costing the state nothing so to speak, and which has the indorsement of the railroad companies, all the commissions and the various automobile associations, should have met with defeat.

The New England states—Massachusetts, New Hampshire, Connecticut and Vermont—have passed legislation along the lines suggested and have the signs in position, and a number of western states have also done so.

If you will carry this message to your representatives so that when they again assemble they will not treat with indifference a measure of so great merit, I will feel that my talk to you has not been entirely in vain.

Indiana Road Funds Released

Action of State Officials Makes Possible Utilization of Upwards of \$5,000,000 of Bond Money

Action taken by state officials of Indiana has made possible the expenditure of between \$5,000,000 and \$7,000,000 of road funds, which it has been impossible to use because of conditions due to the war.

The total amount of construction funds on hand in different counties of the state where bonds have been sold will amount to between \$5,000,000 and \$7,000,000, according to Gilbert H. Hendren, State Examiner of the Board of Accounts. While some of the work for which the bonds were sold has been started, a large portion of it has been held up because the money cannot be used except for the construction of roads of the specific types for which the bonds were voted, the "Three-Mile Law," under which the work is to be done, not providing for the substitution of materials. The counties are receiving only 2% for the money, while they are paying 4½% on the bonds.

Mr. Hendren, with the approval of Governor Goodrich, State Auditor Otto L. Klauss and M. E. Foley, Chairman of the State Council of Defense, has recently sent out a letter to all county attorneys, auditors and commissioners, advising them that the money may be used by substituting a different type of road from that originally called for, provided it is done in the manner suggested by him. Mr. Hendren's communication is in part as follows:

"There is no authority of law to change plans and specifications nor for making an allowance for extra work after a contract has been let under the 3-mi. gravel road law. This ruling has been sustained by our higher courts, but owing to abnormal conditions, due to the war, it is in many instances impossible for contractors to secure shipments of material specified within a reasonable time, and this necessitates a change of material or the work will stop. If a change of specified material for other suitable and available material becomes a public necessity we will not object to a change as an indispensable public necessity upon the following basis:

"If the contract be for the construction of a crushed stone road and stone cannot be had and gravel suitable for road building can be substituted a new estimate may be made by the engineer and viewers who made the original estimate, with the approval of the board of county commissioners and the county attorney, based upon the price of gravel at the time the original contract was awarded, and deduct from the contract price the difference between the

(Continued on page 34.)

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

WITH WHICH IS INCORPORATED

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

July 27, 1918

PREVENTION OF GRADE CROSSING ACCIDENTS

Although the only sure way to prevent accidents at railroad and highway intersections is to eliminate grade crossings, much is possible in the way of preventing mishaps at the many places where separation of grades is not feasible. The measures adopted by the Long Island Railroad and the success that has attended them are described elsewhere in this issue.

As Mr. Addison says, the grade crossing hazard has existed ever since there were railroads. It will continue to exist for a long time to come, for grade crossing work is costly and the number of crossings is enormous. Its seriousness varies, of course, with a numbers of factors, but is almost everywhere sufficient to merit most careful consideration in the administration of highway affairs.

The existence of an intersection at grade is generally the result of an effort to save money, sometimes on the part of the railroad, sometimes on the part of the road authorities, oftener both. Most grade crossings were put in years ago when traffic conditions were very different from those of today. Traffic on the highways was infrequent, according to present standards; it moved slowly; and it is doubtless true that the comparatively few people who drove were more careful than the drivers of today. The railroad traffic was also light. With these conditions in mind it is not difficult to understand why saving the cost of over or under crossings generally outweighed the safeguarding of road users.

In the remarkable development of highway transportation during the past two decades, this problem, like most of those that the road builder has to face, has assumed an entirely new aspect. The need for elimination has increased and the installation of safety devices where elimination is out of the question has become imperative.

It is in the development of these safeguards that there is an opportunity for highway engineers, for it falls upon them as naturally as upon anyone. There are many methods of protecting crossings, some depending wholly or in part upon manual control. It would seem that the logical end toward which to work is the elimination of this factor of human operation, for properly designed mechanical contrivances are both more reliable and less costly.

FEDERAL CONTROL OF MOTOR VEHICLES

Before the motor-driven vehicle became the efficient machine it is today local licensing and registering systems served the purposes for which they were devised and were reasonably fair to owners of cars and trucks and to the general public.

Today, there is no valid reason for continuing local control of passenger and freight carrying motor cars. It has been tried and found wanting and should be scrapped in favor of federal control.

A few years ago the passenger automobile was essentially a "pleasure car." As a rule, it was used only for short journeys and, unless its owner happened to live near a state line, it was seldom taken from one state to another. Naturally, therefore, the average owner was put to very little inconvenience or expense because of the different laws of the several states.

All this has been changed by the increase in the use of motor cars and the development of the vehicle which has made possible its use for longer trips.

These changed conditions are even more marked in the case of motor trucks. Within the past year or two long distance trucking has become common, a single trip frequently taking a car into several states.

Under these circumstances, the differences in license regulations and in laws regulating traffic have become a nuisance to owners and operators of passenger cars and trucks, and have seriously militated against the effective use of this method of transportation. Automobilists have long advocated federal license to obviate the inconvenience of interstate travel, and with the increasing use of the motor truck as a freight carrier the desirability of some such system has been brought home to shippers and others benefiting from the carrying of commodities over the highways.

Certain difficulties in the way of federal control and regulation are to be expected, but these would undoubtedly be more than offset by the obvious advantages that would accrue from such a system. One of the most troublesome adjustments would probably be that of apportioning the revenues derived from the registration of vehicles and the licensing of operators. In many of the states these funds have been used for the improvement of roads and there would undoubtedly be opposition to any proposal to deprive a state of this part of its revenues. Some method of returning them or a part of them to the state in which the owner of the car resided or did business could be devised, however, just as certain portions of such funds are now turned back to counties and other divisions within the state.

Attempts are being made to secure federal legislation along this line and it would seem that road builders could well join with road users in efforts to secure the early enactment of federal legislation.

Indiana Road Funds Released

(Continued from page 32.)

cost of gravel and the cost of stone. If gravel is specified and cannot be had and stone is substituted the same method should be used.

"If a change be necessary in the construction of a steel or concrete bridge on such roads, if concrete is specified and the material needed cannot be had and steel can be substituted a new estimate should be made, with the approval of the board of county commissioners and the county attorney, based upon the price of steel at the time the original contract was let and settlement made upon a basis of prices at that time, or if steel is specified and cannot be had and concrete is substituted the same method should be used.

"When any substitutions of materials have been agreed upon, as aforesaid, by the original viewers and engineer, before the same are finally approved by the board of county commissioners and county attorney the amended plans and specifications and the old plans and specifications for comparison on the basis herein must be sent to this department for inspection by a competent civil engineer of the faculty of Purdue University.

"You understand these changes are suggested only when bonds have been sold and the money is in the treasury and work has not been commenced for the reasons above mentioned, or where work has been commenced and only partly completed. This is an emergency proposition on account of abnormal business conditions due to the war.

"There has been an advance in prices of material and labor since contracts were awarded, and contractors may insist upon the new estimates being based upon current prices, but that would be unfair to the taxpayers and will not be approved.

"The Government has issued orders that the farmer must prepare to store a large part of his wheat on account of a scarcity of cars. He will, therefore, be expected to market his wheat to suit the convenience of the Government, regardless of the condition of the roads. This makes it imperative that all bridges and gravel and crushed stone roads be completed at the earliest day possible. This will not only aid the farmer to market his wheat and other products when needed by the Government, but the material used in the construction of such roads and bridges will greatly aid the cause of labor in the construction thereof, and create a market for such materials as are suitable and available."

Texas War-Time Road Work

State Highway Commission Makes Statement Outlining Its Policies

The Texas State Highway Commission has recently stated its policy in road construction during the war. The statement is in part as follows:

"1.—All plans for road construction and maintenance should be viewed in the light of war conditions, and expenditures of labor and materials should be directed only to those roads which are of prime importance for economic and military purposes.

"2.—It is desirable to avoid offering to the market issues of bonds which are not urgent from the point of view of aiding the nation in winning the war.

"3.—Important highways already constructed should be maintained and only those constructed and completed which are of vital importance because of their bearing on the war situation. These may be summarized as follows:

"Those which are utilized or will be utilized by the military establishment.

"Those which carry considerable volume of material and supplies essential to war industries.

"Those which have a bearing on the production and distribution of food supplies, connecting population and shipping centers with surrounding agricultural areas.

"4.—It is especially desirable to use wherever possible local road material in order to simplify the rail transportation problem."

Philadelphia Contracts Awarded

Work to Cost About \$150,000 Included in Contracts Awarded by Department of Public Works

Contracts for street and bridge work involving an expenditure of about \$150,000 have been awarded by Director Datesman of the Department of Public Works of Philadelphia, Pa. Among the more important contracts are the following:

Resurfacing portions of Frankford Ave., to the Eastern Paving Co. of Philadelphia for \$54,415 and to the Union Paving Co. of Philadelphia for \$21,243.

Repairing and painting the Passyunk Avenue Bridge over the Schuylkill River, to William A. Munday of Philadelphia for \$22,500.

Repairing and painting the Wyoming Avenue Bridge over Frankford Creek, to William A. Munday for \$14,150.

Repairing the Walnut Lane Bridge over Lincoln Drive, to the Robbins Contracting Co. for \$5,000.

Apportionment of Funds to New Jersey Counties

State Aid and Motor Vehicle Funds Amounting to About \$2,500,000 Allotted by Highway Commission

The State Highway Commission of New Jersey has adopted the recommendations of its executive committee and apportioned to the various counties \$425,000 of state aid funds and about \$2,000,000 of motor vehicle funds. The amounts from each fund are as follows:

County.	State Aid Funds.	Motor Vehicle Funds.
Atlantic	\$16,000	\$115,000
Bergen	35,000	180,000
Burlington	15,000	165,000
Camden .....	.....	108,000
Cape May	20,000	50,000
Cumberland	5,000	25,000
Essex	30,000	180,000
Gloucester	11,000	30,000
Hudson	40,000	11,000
Hunterdon .....	.....	40,000
Mercer .....	.....	110,000
Middlesex	16,000	105,000
Monmouth	50,000	150,000
Morris	30,000	105,000
Ocean	2,000	5,000
Passaic	35,000	140,000
Salem .....	.....	52,000
Somerset .....	.....	50,000
Sussex	50,000	40,000
Union	30,000	7,000
Warren	20,000	40,000

Roads between St. Louis, Mo., and Jefferson Barracks are to be improved at a cost of \$78,000, St. Louis County paying one-half and the state the other half. Work is to be done on the Lemay Ferry Road and the Telegraph Road between the city limits and the barracks. The work is to be done by convicts from the state penitentiary.

The Construction of a Coast-to-Coast Highway, with numerous laterals, was urged in a resolution adopted by the National Association of Real Estate Boards at its recent annual convention at St. Louis, Mo. The resolution called for the commencement of the work immediately after the war, and suggested that plans be made at once so that work might be commenced without delay as soon as material and labor became available.

Kentucky's War-Time Road Policy

General Statement of the Attitude of the Department of Public Roads Toward Highway Work During the War

By RODMAN WILEY*

The policy of the Government is to give preference to the maintenance of roads which have already been properly built, and the construction of new roads is not advocated unless they are of economic or military importance.

It is the intention of this department to comply with the wishes of our Government in every respect.

Owing to the shortage of labor, the high cost of materials and the insufficient road funds of the various counties of this commonwealth it is considered advisable at this time to indicate in a general way the attitude that will hereafter be taken by the office concerning roads.

The engineers of the department have been instructed to carefully inspect each road which has been built under state aid, and the various county officials will be advised concerning the necessary work to be done to bring the roads up to standard.

The above is in accordance with the maintenance law recently passed by the General Assembly.

It is to be hoped that the county officials will appreciate the fact that the maintenance of roads is an economical proposition. A few men, at the proper time, might make the necessary repairs on a road, whereas if the road were allowed to go untouched it would in time require many men to put the road into good, passable condition. So from a question of man-power the road should be maintained. Besides proper repairs protect the original investment; it is a waste of money to build and not maintain.

Counties are at liberty to do the work in order to bring the roads up to the standard so prescribed, or if a county so desires the state will share in the cost of maintenance on the same basis as other state aid work. Should a county decide that it wants the state to participate in the cost of maintenance, and after provision has been made to care for all such work should there remain any state aid money to the credit of the county it can be used to do other state aid work.

In designating intercounty seat roads upon which state aid is desired, county authorities are requested to name the most important roads in the county, because we feel that such a move will be a patriotic one and certainly the most economical thing to do at this time. In other words, keep the main roads in passable condition.

In case a county considers that a new road would be of economic military importance, sufficient proof must be submitted to substantiate the claim or else approval by this department may be withheld.

Counties to avoid shipping by railroad should, if possible, use local materials, as the Government needs practically all of the open-top cars for the transportation of coal, coke, iron ore and such things.

Counties attempting new construction where there are no materials which can be used for surfacing purposes are advised to build graded earth roads, well drained, upon which a surface can be placed at some future time. It makes no difference what type of road is contemplated, the road must first be graded and drained and every cent expended for such an improvement is a permanent investment, and a well graded earth road properly maintained is of great benefit to any county.

In building new roads the standards of the department

so far as grades, widths of road, drainage, surfacing, etc., will be followed as they have been in former years.

In reconstructing old, well established roads where no grading operations are contemplated, it will be the policy of the department to see that the road is well ditched; that sufficient draining structures are installed, and that metal for the surface is used sparingly.

In resurfacing—or what might be properly called maintaining—old established macadam roads, such as now exist in central Kentucky, the roads should be properly ditched and adequate drainage structures built where necessary and the surface repaired. In other words, we will endeavor to use as little rock as possible, and the aim will be to get the road in good, passable condition rather than to attempt to build a boulevard.

It is the experience of the department that where reconstruction or resurfacing work is done, it requires the strictest attention to the most minute details in order to get a satisfactory piece of work. For that reason it will be necessary to make a detailed survey of each road with an idea of saving labor and materials in doing the work.

All the above is given as a general example, because it is appreciated by everyone that each road presents a distinct problem in itself.

No new steel bridges are advocated and where it is necessary to build bridges wooden structures are recommended. For all other drainage structures there will be used some kind of culvert pipe, plain concrete, or stone masonry, in order to conserve the supply of iron and steel.

In deciding upon the above policy, it is the earnest desire of this office, especially at this time, to render the greatest service to the counties, the state and the nation, and with the proper cooperation of the county officials we hope to be able, with the available men, to keep the roads in a good, passable condition during the period of the war.

Road Work in Ramsey County, Michigan, in 1919

Present Plans Call for the Construction of 25 Miles of Road at a Cost of \$127,400

According to plans recently completed by County Engineer J. H. Armstrong of Ramsey County, Michigan, 25 mi. of road will be improved in 1919 at a total cost of \$127,400. Mr. Armstrong has announced that with the completion of this program the county will have 225 mi. of good road, comprising all of the main highways. The \$127,400 to be expended will consist of \$97,400 from taxation and \$30,000 in state aid. The principal improvements included in the 1919 schedule are as follows:

Hamline Ave., Valentine Lake Road to Manomin Road, 1 mi., grade, clay and gravel, \$5,000; Patton Road, Long Lake Road west to Silver Lake Road, 1 mi., clay and gravel, \$2,500; Fairchild Ave., Dale St. to Rice St., 1 mi., grade, clay and gravel, \$4,500; Hamline Ave., Crosley Road to Lake Josephine, 2 mi., gravel, \$4,200; Dale St., Crosley Road north, 1 mi., gravel and improve, \$2,000; New Brighton Road, ½ mi., resurface with asphalt macadam, \$4,500; Snelling Ave., from Robinson Lake Road north, ¾ mi., grade, clay and gravel, \$3,500; Anoka County Line Road from Centerville Road east, grade, clay and gravel, \$10,000; Highwood Road,

*Commissioner of Public Roads of Kentucky.

1 mi., clay and gravel, \$2,500; Margaret St. from Duluth Highway to White Bear-Phalen, 2 mi., grade, clay and gravel, \$9,000; Otter Lake Road, 1 mi., clay and gravel, \$2,700; Labore Road from Edgerton St., 1 mi., north, grade, clay and gravel, \$4,500; Duluth Highway, resurface with asphalt macadam, \$4,500.

Proposed Changes in A. R. B. A. Constitution

Amendments to Three Articles of the Constitution of the American Road Builders' Association Being Voted Upon by Members

The Board of Directors of the American Road Builders' Association has approved several amendments to the constitution of that organization, and letter ballots have been sent to members. The changes affect those articles dealing with the classes of membership, the division of the membership into sections and the election of officers. The ballots will be canvassed at a meeting of the board of directors at the association's headquarters, 150 Nassau St., New York, N. Y., on Aug. 15.

The proposed amendment to Article V is as follows:

ARTICLE V Membership

Section 1. The association shall have five (5) classes of members, viz.: active, life, sustaining, contributing and honorary members.

Section 2. Active members shall be persons who are actively engaged in laying out or supervising work of construction and maintenance of highways and streets and those interested in highway development. Active members shall be elected in accordance with the by-laws adopted by the association.

Section 3. Life members shall consist of active members making a payment of one hundred dollars (\$100) upon their election to membership.

Section 4. Sustaining members shall be companies or organizations who contribute two hundred dollars (\$200) per year.

Section 5. Contributing members shall be companies or organizations who contribute fifty dollars (\$50) per year.

Section 6. Honorary members shall be those who have performed distinguished service in the cause of highway extension and improvement. They shall be nominated by the board of directors and elected by the association.

Section 7 of the present article is to be omitted.

The present constitution provides for five classes of members: active, associate, honorary, contributing and life. The principal change proposed is the elimination of associate membership and the substitution of sustaining membership therefor. The present and proposed qualifications of active members are the same, as are also those of honorary members and life members. Under the present constitution contributing members are commercial bodies contributing \$100 a year, while associate members are societies and other organizations interested in the objects of the association and paying annual dues of \$10. Section 7 of the present constitution, referred to above, stipulates that only active members shall vote or hold office.

Article VI, as proposed, is as follows:

ARTICLE VI Districts

The territory from which the membership is drawn shall be divided into four districts, as follows:

1. The northeastern district to include the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania and Ohio, and the provinces of Quebec, New Brunswick, Nova Scotia and Newfoundland.

2. The southern district to include the states of Delaware, Maryland, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Florida, Mississippi, Louisiana, Arkansas and Texas, the District of Columbia and Porto Rico.

3. The central district to include the states of Indiana, Illinois, Michigan, Wisconsin, Minnesota, North Dakota, South

Dakota, Nebraska, Iowa, Missouri, Kansas and Oklahoma, and the provinces of Ontario and Manitoba.

4. The western district to include the states of Montana, Idaho, Washington, Oregon, California, Nevada, Utah, Wyoming, Colorado, New Mexico and Arizona, together with Alaska, Hawaii, the Philippine Islands, the provinces of Canada not included in the northeastern and central districts, and all foreign countries.

This covers the matters now covered by Article VII which provides that sections may be established in as many of the states of the Union and provinces of Canada as may seem desirable, each section to be presided over by an active member of the association.

The proposed Article VII, which corresponds to Article VI of the present constitution, is as follows:

ARTICLE VII Officers

Section 1. The officers of this association shall be elected from its active membership and shall consist of a president, four vice presidents, one (1) of whom shall be elected from each district, a secretary, a treasurer, and twenty-one (21) directors, who, together with the last five (5) living past presidents, shall constitute a board of directors, from which shall be elected an executive committee of five (5), one of whom shall be the secretary of the association and not less than two (2) others shall be residents of the northeastern district.

Section 2. The president, vice presidents, secretary and treasurer shall be elected for one year. Directors shall be elected to serve for three years. All of the above officers shall be elected at the annual meeting of the association and in accordance with the provisions of the by-laws.

Section 3. The secretary, the treasurer and ten (10) of the twenty-one (21) directors shall, at the time of their election, be residents of the northeastern district. Of the remaining eleven (11) directors, four (4) shall, at the time of their election, be residents of the southern district, five (5) of the central district and two (2) of the western district. The above number of directors and their apportionment among districts shall be brought about in the following manner:

In the year 1918 four (4) directors shall be elected from the northeastern, one (1) from the southern and two (2) from the central district.

In the year 1919 three (3) directors shall be elected from the northeastern, one (1) from the southern, two (2) from the central and one (1) from the western district.

In the year 1920 three (3) directors shall be elected from the northeastern, two (2) from the southern, one (1) from the central and one (1) from the western district.

Thereafter seven (7) directors shall be elected each year in such manner as to maintain the representation of the several districts herein described.

The present article dealing with officers is as follows:

Section 1. The officers of this association shall be selected from its active membership and shall consist of a president, three vice presidents, a secretary, a treasurer and eighteen directors who, together with the last five living past presidents, shall constitute a board of directors from which shall be elected an executive committee of three, one of whom shall be the secretary of the association.

Section 2. The president, vice presidents, secretary and treasurer shall be elected for one year. Six directors shall be elected each year to serve for three years. The term of office of the officers elected for one year on February 4, 1916, however, shall end on the first Friday in November, 1916, and the term of office of directors elected previous to November, 1916, shall end on the first Friday in November preceding the end of the term for which they have been elected.

The Massachusetts Highway Commission has opened the state road between Stockbridge and Great Barrington, a scenic automobile highway which has been under construction for over a year. The road crosses Monument Mountain and cost about \$150,000.

The Force of the Indiana State Highway Commission has been discharged pending the decision of the Supreme Court on the validity of the highway commission law. The case is being tried on an appeal from the County Court of Hamilton County, which held that the law was invalid.

M E E T I N G S

Calendar of Coming Meetings

Aug. 7-9.—North Carolina Good Roads Association.—Annual convention, Wilmington, N. C. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Oct. 7-9.—American Association of State Highway Officials.—Annual meeting Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Nov. 14-15.—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Merchants' Association of New York

The Merchants' Association of New York held a meeting on Monday, July 15, for the discussion of the store door delivery plan which is to be put into effect in New York City on Aug. 15.

The chief speaker at the meeting was James S. Harlan of the Interstate Commerce Commission. Mr. Harlan explained the system in detail, answering many questions by those present. Among the other speakers were Roy D. Chapin, Chairman of the Highways Transport Committee of the Council of National Defense, and J. C. Lincoln of the Traffic Bureau of the Merchants' Association.

North Carolina Good Roads Association

As previously noted, the annual convention of the North Carolina Good Roads Association will be held at the Oceanic Hotel, Wrightsville Beach, Wilmington, N. C., on Wednesday, Thursday and Friday, Aug. 7, 8 and 9. It will be preceded by a meeting of the executive committee of the organization at 8:30 p. m., Tuesday, Aug. 6.

The first session will be held on the forenoon of Wednesday, Aug. 7, and will be devoted to addresses of welcome, responses, reports of officers and committees and an address by Governor Bickett of North Carolina.

Among the papers and discussions at the remaining sessions are the following.

Wednesday afternoon: "A Summary of the Accomplishments of the State Highway Commission," W. S. Fallis, State Highway Engineer of North Carolina; "An Increased Appropriation for the Highway Commission," E. C. Duncan and Guy V. Roberts of the North Carolina State Highway Commission; "Cooperation of the State Highway Commission with County Authorities," R. E. Snowden, Division Engineer, North Carolina State Highway Commission; "Cooperation of County Commissioners with State Authorities," D. H. Williams, County Commissioner of Duplin County, W. T. Lindsay, Secretary, Board of County Commissioners of Polk County, and W. M. Ferebee, of Pasquotank County.

Wednesday evening: "Use of Modern Equipment in County Road Construction," C. B. Scott, Assistant State Highway Commissioner of Virginia; "Shade Trees Along our Public Roads," (illustrated) J. S. Holmes, State Forester of North Carolina.

Thursday forenoon: "Work of the Highway Industries Association and Necessity for Close Cooperation between Federal, State and County Road Authorities," Henry G.

Shirley, Secretary, Highway Industries Association; "The Federal Aid Road Law," representative of the U. S. Office of Public Roads and Rural Engineering; "The Federal Aid Law as it has Worked Out in North Carolina," W. S. Fallis, State Highway Engineer of North Carolina, Osmonde Brown, Chairman, Board of County Commissioners of Catawba County, A. A. Hicks, County Attorney of Granville County, and Dr. J. W. Peacock, Chairman, Board of County Commissioners of Davidson County.

Thursday afternoon: "A State Bond Issue," D. M. Clark, Pitt County, North Carolina; "A Graduated Wheel Tax," W. D. MacMillen, County Commissioner of New Hanover County, North Carolina; "A General and Abutting Property Tax," W. S. Wilson, Legislative Reference Librarian and Secretary, North Carolina Automobile Association; "Types of Road Construction to Meet Future Traffic Needs," R. G. Lassister, Member, State Geological Board; "Relative Economy of Different Types of Road Construction during the Present Abnormal Conditions Governing Cost of Labor and Materials," R. P. Coble, Division Engineer, North Carolina State Highway Commission.

Friday morning: "A Report on State Maintenance," D. H. Winslow, Chief Engineer, Division of Maintenance, North Carolina State Highway Commission, T. M. Howerton, County Engineer of Buncombe County, W. S. Horen, Chairman, Board of County Commissioners of Guilford County, J. R. McQueen, Road Commissioner of Moore County, and E. T. Mickey, Chairman, Board of County Commissioners Forsyth County.

Friday afternoon: "Wide Tires as an Aid to Maintenance," George E. Butler, of Sampson County; "Report on the Norfolk-Wilmington Highway and Bankhead Highway," Bennehan Cameron; "Report on the Wilmington-Charlotte Highway," T. L. Kirkpatrick of Mecklenburg County, and G. Herbert Smith of Columbus County; "Report on the Charlotte-Asheville Dixie Highway and Hickory Nut Gap Road," N. Buckner, Secretary, Board of Trade, Asheville, N. C.; "Report on Wilmington-Goldsboro Highway," D. H. Williams, Chairman, Wilmington-Goldsboro Highway Association.

Friday evening: "Work of Commercial Associations for Good Roads," C. W. Roberts, Secretary, North Carolina Commercial Secretaries' Association.

The Friday evening session will also include the business meeting of the organization, at which reports of the auditing, resolutions, membership, nominations and next meeting place committees will be received, and officers will be elected for the coming year.

There will be an automobile tour over New Hanover County roads on Friday forenoon at the close of the morning session.

The County Commissioners of Stark County, Ohio, have awarded a contract for repairing all the macadam roads of the county to the Highway Construction Co. of Elyria at \$30,000. It is stated that "tarvia" and crushed slag will be used as a surfacing.

State Highway Commissioner O'Neil of Pennsylvania has awarded a contract for the construction of 3.01 mi. on State Highway Route 84 between Erie and Waterford to J. Ross Mayer, of Erie, at \$109,134.73. The road will be paved with bituminous concrete on a cement concrete foundation, 16 ft. wide.

EQUIPMENT—TRADE—MATERIALS

New Motor Truck Dumping Body

A dumping body for use with 1-ton Ford motor trucks that has recently been put on the market is operated automatically by the weight of its load.

A view of the body in the discharging position is shown in the accompanying illustration. The body is mounted upon the chassis by means of rockers of such shape that the weight of the material performs the work of tipping the body after the motion has been started by the operator. As soon as the load is dumped, the body returns to the normal position and is locked in place. The operation is started by a lever at the driver's right hand. Slightly raising this releases a latch and allows the body to move backward. This movement can be arrested at any angle by



ANTHONY ROCKER DUMP BODY MOUNTED ON CHASSIS OF FORD 1-TON TRUCK.

again raising the lever, thereby operating a brake working upon a drum around which is wound a chain attached to the front of the body.

The body is made of steel and has a capacity of $1\frac{1}{2}$ cu. yd. Its inclination when the front end is at the maximum height is 50 deg.

The device is known as the "Anthony Rocker Dump Body," and is manufactured by the Anthony Co., Inc., of Streator, Ill.

"The Barrett Trail"

The first number of a house organ bearing the above title has recently been issued by the Barrett Company of New York, N. Y.

According to the editorial announcement, the publication will appear on or about the first of each month and will be devoted to the news of the company.

The magazine is 7x10 in. in size and the first number consists of 44 pages and covers. It is well printed and profusely illustrated.

The contents of the first number include an honor roll of the various offices and factories of the Barrett Company, several pages of letters from the company's men in service, correspondence from the company's offices and plants, several pages of humor, and a number of short special articles. The inside of the back cover contains a list of the company's paving materials and other products, and the last

page a list of the officers, directors, branch sales offices and factories of the company.

"National" Pavement Booklet

"National Pavement 'The Right Road,'" is the title of an attractive and interesting booklet recently issued by the Permanent Highways Corporation of 50 E. 42d St., New York, N. Y.

The contents of the booklet include several paragraphs describing the requisite qualities of a good road, a number of pages of matter descriptive of the construction of the "National" pavement and of its advantages, several paragraphs on the importance of roads under present conditions, and commendatory letters from the Kansas City Testing Laboratory, Dow & Smith, and several engineers under whose direction "National" pavement has been laid.

The booklet is 6x9 in. in size and consists of 20 pages and covers. It is printed on paper of fine quality and is illustrated by half-tone reproductions of pictures of "National" pavement in Glen Ridge, Belleville and Milburn, N. J.; New Haven, Conn., and Jackson County, Missouri.

The General Electric Co. has recently issued a 12-page booklet, 4x7 in. in size, describing type IL series transformers. The booklet contains tabular data on the transformers and a general description. It is illustrated by half-tone reproductions of photographs of the transformers and by drawing showing methods of installation.

The Austin Manufacturing Co. has recently issued a new catalogue describing motor road rollers. The catalogue is 9x12 in. in size and consists of 64 pages and covers. Its contents include general and detailed descriptions of Austin three-wheel and tandem rollers, and a large number of half-tone reproductions of photographs of the machine and its parts and of rollers in service in this and other countries. The catalogue is printed in two colors, the text in black and the illustrations in brown, on heavy white paper. The covers are of heavy stock, printed in several colors.

PERSONAL MENTION

F. C. Black has been appointed City Engineer of Hoquiam, Wash.

J. D. Kervin has resigned as City Engineer and Street Commissioner of Waxahachie, Tex., to become manager of a graphite mine at Llano.

William Holden has resigned as engineer in the Department of Streets and Sewers of St. Louis, Mo.; to become General Secretary of the Commercial Club of Sioux City, Ia.

Alvin Horwege has resigned as City Engineer of Petaluma, Cal., to become Assistant Engineer with the Emergency Fleet Corporation. Mr. Horwege's headquarters will be at Alameda, Cal.

J. W. Archibald, formerly of the Warren Bituminous Paving Co. of Ontario, has been appointed Canadian representative of the Pioneer Asphalt Co. of Chicago. Mr. Archibald's headquarters will be in Toronto.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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NEW YORK, AUGUST 3, 1918

Number
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Determination of the Shrinkage of Gravel and Sand-Clay Mixtures Packed by Traffic

By ROY M. GREEN*

In communities where gravel roads are used to a great extent, engineers are often confronted with the question of whether the contractor placed the required thickness of gravel on the road at the time it was constructed. In many cases where the work has been done in a more or less careless way and an inspector has not always been on the work, this is a question that is not easily answered, as various gravel mixtures do not compact the same under the action of traffic. In the mind of the layman, the question appears to be of great importance when he finds, upon making an opening in the road, that there is a thickness of only 5 in. when he knows that the specifications called for 8 in., loose measure.

The method of checking the shrinkage in such cases has commonly been to take measurements before and after the

material has been subjected to the action of traffic. In cases where construction has been completed this method fails on account of not having an opportunity of making measurements of the depth of the material before compaction. In such cases a laboratory method presents itself and may be resorted to in case of dispute. The method follows:

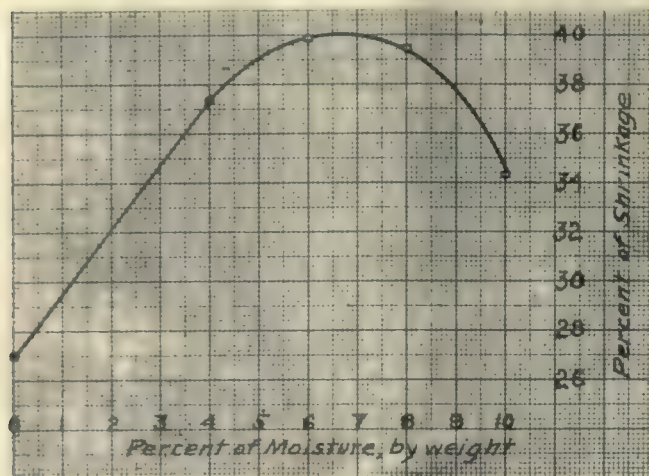
Solid samples of the road crust, approximately 8 in. square, are cut from the surface by carefully removing the material around them to the full depth of the road metal and lifting out the sample in a single piece. Samples obtained this way are then taken to the laboratory and their density determined after they have been thoroughly dried. Since the samples are cemented together by clay it is impossible to determine their density by the ordinary method of submersion in water. However, since the clay is not broken up by the action of oil, the density of the samples may be determined by submerging them in oil, taking into

* Assistant Professor of Highway Engineering, Agricultural and Mechanical College of Texas.



A STRETCH OF GRAVEL ROAD IN LEE COUNTY, NORTH CAROLINA.

consideration the specific gravity of the liquid. As the oil penetrates the surface of the samples to a slight extent it



SHRINKAGE CURVE FOR A SAND-CLAY AND GRAVEL MIXTURE—PLOTTED FROM A TEST MADE AS DESCRIBED IN TEXT.

is also necessary to obtain the increase in weight due to this cause and to make a proper correction accordingly. The absolute density of the materials in the mixture may

then be determined by the usual method. From this information it is possible to obtain the percentage of air space in the compacted samples.

The percentage of voids in the loose materials may then be determined by the usual method of weighing the material in a vessel of known volume and calculating the voids from this weight and the specific gravity of the mixture. Since the shrinkage also depends upon the percentage of moisture contained in the mixture it is necessary to make several weighings as described above, starting with a dry mixture and adding a known quantity of water and mixing thoroughly before each weight is taken. From the knowledge of the percentage of voids in the loose and compacted mixtures the shrinkage may be determined, taking into consideration the fact that the percentage in the two cases is based upon the apparent volume of the material, which is greater in the case of the loose material.

The figure shows a curve plotted from information obtained as described above, the tests having been made upon sand-clay gravel mixture. Since the material coming from the pit contained approximately 6% moisture, by weight, it is safe to assume that the work was done with a material containing from 5 to 8% of moisture. When more than 8% of moisture was added the clay in the moisture became muddy and was not in a working condition. The shrinkage would, therefore, be from 39 to 40% of the original volume.

Disposition of Texas State Highway Funds*

Discrimination Against Cities in the Distribution of Funds from Automobile License Fees

By O. J. S. ELLINGSON†

The state highway laws of Texas are, in my opinion, just, except Section 23, which provides for the disposition of the state highway fund, namely, one-half of the total license fee for each automobile is kept by the state at Austin and the other half is returned to the county from which the automobile was registered, to be expended by or under the direction of the commissioners' court in the maintenance of public roads of such counties (not cities) in accordance with plans approved by the State Highway Department.

Please note that no provision is made for cities to receive one penny. On the other hand, half of the license fees paid by parties living in incorporated cities goes back to the county in which the cities are located, and the money is spent by the commissioners' court for the maintenance of public roads outside the corporate limits of such cities. This is not only discriminatory but unjust.

To keep from making a mistake I took this matter up with Mr. Curtis Hancock, Chairman of the State Highway Commission, and asked him to construe Section 23 of the Highway Act. His reply verified my construction of this passage.

Believing that it might be possible to eliminate this unjust discrimination against the cities in favor of the rural districts, last November I wrote the following letter to numerous mayors in the state:

We are advised by Mr. Curtis Hancock, Chairman of the State Highway Commission, that section 23 of the Highway Act "provides for the disposition of the state highway fund and doesn't provide that any portion shall be returned to the cities, but to the counties." This act also provides that the money returned to the county shall constitute a special fund to be expended by or under the direction of the commissioners' courts in the

maintenance of public roads of such counties (not cities) in accordance with plans approved by the State Highway Department.

Section 37 reads as follows: "The fees collected for violation of any of the provisions of this act shall be used by the municipality or the counties in which same are used in the construction and maintenance of roads, bridges and culverts in the city or county where such convictions are had."

You are also familiar with the fact that the money assessed against city property by the counties for road and bridge purposes is always used by county officials for the construction and maintenance of roads, bridges and culverts in the county and never within the corporate limits of the cities. However, the money is collected from property within the corporate limits of the city.

The State Highway Commission collects the licenses for the operation of automobiles and keeps one-half of the money for state highway roads and the other half is turned over to the counties to build and maintain roads within the counties, under the direction of the commissioners' courts in accordance with plans approved by the State Highway Department. The city does not receive for street maintenance and construction one cent of this money.

We find that about one-third of the cars in the whole of Grayson County are owned by citizens living within the limits of the City of Sherman and presume that you will find that the greater per cent. of the cars in your county are owned by citizens living within the corporate limits of the cities in same.

Inasmuch as city property is taxed by the county for maintaining the county roads outside the corporate limits of the city, we do not see why, in addition to this, city automobile license money should all go to the state and county and not have some returned to the city for the maintenance of streets within its limits.

We would like to have an expression from you along this line, as we feel that if enough of the cities have the same opinion as ours the cities can bring enough pressure to bear upon the Legislature to have the city's portion of the money returned to the county, turned over to the city for its use.

I am going to take the liberty of reading to you a few replies I received.

(Continued on page 42)

*Paper presented at the sixth annual convention of the League of Texas Municipalities, San Antonio, Texas, June 19-20, 1918.

†City Manager of Sherman, Tex.

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Number

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

August 3, 1918

WHY TAX MOTOR TRUCKS?

It is understood that a twenty per cent. tax on automobiles, trucks and trailers has been recommended by the Treasury Department for inclusion in the revenue bill, which at this writing is being considered in secret session by the Ways and Means Committee of the House of Representatives.

Among a host of unreasonable items that have been proposed by responsible authorities, this particular one stands out as an evidence of a lack of comprehension of the present situation. It is in the same category as the measure establishing a zone system of second class postal rates and, like that measure, can result only in hindering the accomplishment of the things Congress is supposed to be trying to bring about.

It does not require any extraordinary grasp of the present situation to realize that this country's success in winning the war depends quite as much upon transportation as upon any other one factor in the problem we are facing. Nor does it require more than a superficial knowledge of railroad operation during the past year and a half to appreciate the fact that the railroads cannot be depended upon to fetch and carry all the commodities that have got to be moved. There remain the inland waterways—of only very limited possibilities in their present state of development—and the public highways.

There can be no doubt that it is to the highways that we must look for relief from present and future transportation

difficulties. Most of the requisite roads exist, and great efforts are being made to put them into condition to render the maximum service of which they should be capable.

But highways alone are of no use. Just as miles and miles of railroad track are worse than useless without rolling stock, ever so great mileage of good roads would be of little or no value unless there were vehicles to use them. That motor trucks, tractors and trailers constituted the "rolling stock" requisite to the use of the roads needs no proof.

Since transportation is vital to the work of war; since the necessity of transportation makes the highways essential, and since motor-driven vehicles, and trailers, make highway transportation possible, it is difficult to find logic or even common sense in any measure that even tends to restrict that means of transportation.

In fact, the Government is both illogical and inconsistent in its treatment of the whole matter of highway transportation. On the one hand, the executive branch, through various departments, urges the utilization of the country's highways to supplement the railroads, while on the other hand, the legislative branch discourages such use by the serious consideration of an unjust and excessive tax on the means for using the roads.

The motor truck has already done much towards solving the knotty problem of transportation. If permitted to develop unhindered it will do still more. A twenty per cent. tax on retail sales of trucks and trailers and upon tires for them will certainly not encourage their use. It may yield large revenues, but those revenues will be offset many times over by the harm that will be done in restricting the rapidly developing traffic over the country's roads.

ALLOTMENT OF FUNDS FROM MOTOR VEHICLE FEES

A question that has caused trouble in many states has been raised in Texas, as is set forth in a paper, printed on other pages of this issue, on the distribution of the funds collected in fees for automobile licenses.

In accordance with the present highway law of the state, this money constitutes a state highway fund, one-half of which is retained by the state and the other half is returned to the counties in which collected for expenditure by the county authorities under the general supervision of the State Highway Department. None of the fees collected in cities find their way back to the city treasuries and the writer of the paper, a city manager, complains that the county officials use their share of the funds for work on roads outside of the corporate limits of the cities. His views appear to be those of the chief executives of a number of the larger Texas cities.

There is a measure of justice in the contention that a part of the fund should come back to the cities, but just how far the principle should be carried is not easy to determine. It presents the same difficulties as would the adjustments referred to last week in these columns in discussing federal registration.

It is now generally admitted, on the other hand, that city taxpayers should be ready and willing to bear a considerable portion of the burden of paying for road betterments in the surrounding rural districts. An automobile owner residing in a city, large or small, is quite likely to use the country roads in his immediate vicinity fully as much as he uses the streets of the city he lives in. And every city dweller is benefited by road improvements in the country, not only in his immediate vicinity, but in distant communities as well.

It is apparent that an effort will be made to have the Texas law amended and the results should prove interesting in other places where similar conditions are faced.

Disposition of Texas State Highway Funds

(Continued from page 40)

The Mayor of San Antonio wrote the following:

I beg to acknowledge receipt of your letter of November 20, and your point of view in regard to funds collected by the State Highway Commission where they are all expended in the county is well taken. However, I believe in our own case the county of Bexar has done a great deal of work within the city limits of San Antonio, our area being 36 sq. ml. But still I am like you, I think that the city paying 85% of the total taxes collected by the county should have some of this money to expend on its streets.

When this matter comes to a focus and the time comes to bring it up before our Legislature, I assure you I will be glad to join you and do all in my power to help to see if a portion of this money cannot be expended within the limits of our city, which is nothing more than our right.

The ex-mayor of Paris served on the legislative committee and gives his experience with same:

I acknowledge with pleasure the receipt of your favor under date of Nov. 20. By way of reply I beg to advise you that one of the funny things in connection with the Highway Act which discriminates so strongly in favor of the rural communities against the cities is that I sat with the committee when the bill was prepared to be introduced at the Legislature. The circumstances, as I recall them, were that I happened to be in Austin just at that time on some business for the city. Judge Beauchamp, who was a member of the legislative committee of the Highway Association, was holding court and, therefore, could not be present at the committee meeting, which was held in Austin. He wired me and also the committee for permission to substitute my name for his, or more correctly speaking, to have me act in his stead at that meeting. The law, of course, was cut and dried, the meeting of the committee was to approve rather than formulate a new bill. Very few changes were made and you can easily imagine the consternation and astonishment that reigned when I took the floor and protested most earnestly against the treatment that cities were receiving under the bill. I made every appeal that I could think of for fairness, and another strange feature of the whole affair was that not a single soul attempted to controvert my position. They contended that the Legislature would never pass any other kind of a bill than this and that for me to fly in the face of their recommendations would jeopardize the passage of the bill, and then, probably, we should lose all of that federal velvet that was coming in the nature of state aid in highway construction, and finally when I could not be comforted they told me that after all the bill would undoubtedly be amended in numerous particulars and probably along the very lines for which I was contending, after the department had been organized. Of course, I was embarrassed throughout the whole proceedings by the fact that I was only a member of the committee by its courtesy and by the request of Judge Beauchamp. I told them, of course, I could do nothing but vote against the adoption of a bill which I felt was a brazen piece of injustice, but my lonely "no" had no effect on the final result.

I am familiar with all the provisions referred to in your letter and think that the cities of the state cannot engage in any more laudable undertaking than to make an earnest effort to secure a legitimate portion of the money returned by the state to the respective sections from which it was taken. I shall be very glad to cooperate with you and others who are interested in any way that I may be able which may be thought effective in securing this result. When you need my counsel or services in any way, command me.

The mayor of Austin, who is with us today, also had given this law attention before its passage.

At a large convention of those interested in good roads, assembled here prior to the enactment of the present Highway Law, I quite emphatically insisted that a certain proper proportion of the income of the department should be turned over to the municipalities of the county in which the taxes were paid, on the ground that the receipts largely come from people and property inside the corporate limits and a part of the same should be disbursed within those same corporate limits.

I did not press the matter upon the Legislature simply from the lack of time to do so. The reason and strong equity of the proposition are so obvious that the Legislature should willingly amend along the lines of your and my suggestion.

The mayor of Dallas thinks the cities should receive their portion of the money:

I wish to acknowledge receipt of your favor of the 20th with reference to section 23 of the Highway Act.

I agree with your contention in this matter and am sure that it would be safe to say that at least one-third of the cars in Dallas County are owned by citizens living within the city limits of Dallas, and possibly more.

I have not heretofore given this matter consideration, but from the mere standpoint of right and justice it would seem that the city's portion of this money shall rightfully be spent by the city within its limits.

The mayor of Greenville strongly advocates a change in the law:

Replying to your letter of the 20th would say that you mentioned a subject that I have thought about considerably, and one which has always excited my indignation on account of the manifest injustice done to cities by the present law. As you say, a large percentage of the tax is paid by persons living in incorporated cities and towns and on property within such municipalities, and yet, as you suggest, not one cent is applied to the upkeep of streets in such cities.

I am unqualifiedly in favor of a change in the law so that cities may have justice in this particular.

The mayor and commission of Ft. Worth want the injustice done to cities by this section of the law rectified:

Replying to your letter of the 19th beg to say the subject therein discussed has been considered by our city commission, and your summing up of the situation is precisely in accord with the conclusion we reached.

This commission will, at the proper time, be glad to join in any movement tending to obtain a correction of this injustice.

The mayor of Wichita Falls thinks that this league should interest itself in this matter:

Answering yours of the 20th inst., relative to the distribution of funds under the State Highway Act, I beg to advise that I agree with you most heartily that at least a just proportion of these funds should be paid to the cities to be used on the streets, and I think some systematic efforts should be made by the various cities looking to an amendment to said act to be proposed to the next Legislature.

It might be well to interest the League of Texas Municipalities in this proposal at its next meeting.

Now you will note that some of these gentlemen have protested against this provision to no avail. The Legislature is not going to seriously consider objection to this law unless some concerted action is taken by the cities to have this section amended so that they will receive their just portion of these funds.

In my opinion, now is the time for this league to take action on this question by appointing a committee which will at once enlist the cooperation of every city official in the state in this movement. Candidates for the Legislature ought now to be called upon by the cities which they are asking to represent to declare themselves as to whether or not they are in favor of amending this section so as to remove this discrimination. When the Legislature convenes next year this committee can go to Austin and see that this law is properly amended.

Brick Pavements are to be Laid between Spartanburg, S. C., and Camp Wadsworth, according to recent advices. It is stated that orders have been issued for the improvement of two main roads between the city and the camp and that work will be started at an early date. The Federal Government will pay half the cost of the work and the other half will be divided between the city and Spartanburg County.

The Development of Rural Motor Express Routes and Return Load Bureaus in Michigan is being promoted by the Michigan Highways Transport Committee, recently formed as a branch of the War Preparedness Board of that state. Since the committee was appointed many messages have been received from people in various parts of the state who are desirous of helping in the movement. While the state will have no financial interest in the work that is done, the committee will assist in selecting the routes, interesting truck owners and aiding chambers of commerce throughout the state.

Vermont's Road Program

State Highway Commissioner Bates Outlines War-Time Policy of Road Department

State Highway Commissioner Stoddard B. Bates of Vermont has recently sent to the selectmen and road commissioners throughout the state, a letter outlining the policy of the State Highway Department in reference to war-time road building. Commissioner Bates calls attention to the Federal Government's attitude, and states the attitude of the Board of Control as follows:

"First, that the maintenance and patrol of the highways should be looked after as carefully as possible so that they may be kept in as good condition as they are now."

"Second, that all highway improvement jobs, except such as are being carried out in conjunction with the federal authorities, should be temporarily suspended, as soon as conveniently can be, without injury to the work, until after haying and, perhaps, until after the crops are harvested."

"Third, that bridges for which state aid is available, ought to be constructed."

Road Work in Harris County, Texas

Status of Contracts Shown in Reports of County Auditor and County Engineer

Contracts awarded and miscellaneous work done by the Board of County Commissioners of Harris County, Texas, have obligated the expenditure of \$692,747.79 from the county bond issue of \$1,100,000, according to a report by the county auditor, in which the situation on July 1 is set forth. The amount actually paid out to that date, however, was \$263,098.43, leaving available \$836,901.57.

While only \$700,000 of the bond issue has been sold, the county is said to be in a position to purchase the remainder with sinking funds of other issues.

The appropriations, amounts paid or obligated and the balances available in the several precincts are as follows:

Precinct.	Appropriation.	Paid or Obligated.	Balance Available.
No. 1.....	\$420,028.....	\$281,801.25.....	\$138,226.75
No. 2.....	235,736.....	117,442.44.....	118,293.56
No. 3.....	184,128.....	78,927.45.....	105,500.55
No. 4.....	187,008.....	163,817.83.....	23,190.17
Miscellaneous.....	200.....	.....	200.00
Army roads.....	72,600.....	50,758.82.....	21,841.18

The county has been allotted \$100,000 of state highway funds and contracts amounting to a total of \$58,982.42 have been awarded. The payments made on these contracts and for other work to be done with the state fund have amounted to \$41,593.48.

Floods Wreck Iowa Roads and Bridges

State Highway Authorities Estimate the Damage at About \$250,000

The damage done to roads and bridges in the central and eastern central counties of Iowa during the floods of the first two weeks in June is estimated at at least \$250,000, according to the "Service Bulletin," the organ of the Iowa State Highway Commission.

The greatest damage was done in Story County, with Hardin County second and Tama, Iowa, Poweshiek, Keokuk, Polk, Jasper, Marshall, Cass, Butler and Green Counties reporting varying amounts of damage. Estimates of the damage in Story County run all the way from \$100,000 to \$200,000, while reports from Hardin County place the damage there at only a little less. The state highway authorities, however, are inclined to the belief that \$100,000 will cover the loss in the latter county. Estimates for other counties are: Tama, \$50,000; Iowa, \$15,000, Poweshiek, \$20,000; Keokuk, \$1,000; Polk, \$20,000; Jasper, \$20,000; Green, \$5,000.

In discussing the results, the "Bulletin" says:

"It will probably be several years before all the damage done by the June flood in these counties will be entirely wiped out. It will certainly be years before the debt necessarily incurred will be paid off, for in nearly every county bridge funds are in such condition that cash funds are not available for replacement and resort will have to be made to sale of bonds."

Virginia Road Contract Plan

General Outline of Method to be Tried Out by the State Highway Department

The Virginia State Highway Department has adopted a plan for carrying on contract road work and is to try it out on a small scale in the near future. So far, only the general method of procedure has been decided upon, the details being left for future attention as the experiment goes on. The plan, as outlined for "Good Roads" by Assistant State Highway Commissioner C. B. Scott, follows:

"1.—All bidders shall name prices for the quantities of work and materials shown in their proposals. The cost of the work, as determined by such prices and quantities, will be herein referred to as the contractor's estimate.

"2.—The contractor shall be paid actual cost for labor and material used in the execution of the work provided to be done under this contract, whether the cost be more or less than the contractor's estimate. The cost of work, thus determined, will herein be referred to as the labor and material cost.

"3.—The contractor will be paid a fee of 20% of the contractor's estimate for his actual supervision of the work, the use, repair and upkeep of all equipment, and all office and other expenses, commonly known as 'overhead expenses,' except that should the labor and material cost be less than the contractor's estimate, the contractor's fee will be increased by the amount of one-half the difference, or should the labor and material cost be greater than the contractor's estimate the, contractor's fee will be reduced by the amount of one-half the difference.

"4.—Should it become necessary to increase or diminish the quantities of work or material shown on the proposal, the contractor's estimate shall be revised accordingly, at the unit prices given. The contractor's estimate, so changed, shall be known as the revised contractor's estimate, and shall be compared with the labor and material cost in computing differences, instead of the contractor's estimate, as first determined.

"5.—The prices to be paid the contractor for labor, teams, materials, and other items of every kind and description, furnished by him, shall be subject to the approval of the engineer.

"6.—The contractor shall furnish bills and payrolls upon forms prescribed by the party of the second part for all items included in the labor and material cost. Bills shall be certified to by the seller and by the contractor. Payrolls shall be signed by the payee and certified to by the contractor.

"All commissions, discounts and allowances, of every kind and description, shall be shown on the bills and shall accrue to the party of the second part.

"7.—Payments will be made promptly upon receipt of monthly statements of amounts due, with certified copies of payrolls and bills, in duplicate, attached, reserving 15% until 90 days after completion."

The City of Pensacola, Fla., will vote on a bond issue of \$170,000 at an election on Aug. 16. Of the total amount of the issue, \$25,000 is for the grading of streets and \$50,000 for paving.

MOTOR VEHICLE TRANSPORTATION

Motor Trucks Build Roads

Machines Utilized to Haul Graders in Various Localities

The need for tractors on the farms has forced those in the habit of employing these machines for road building to look for other sources of power, with the result that the motor truck has been utilized, according to an official of the Kissel Motor Car Co. As an example, he cites the case of the Highway Department of Washington County, Colorado, where one of the department's trucks was used to haul an 8-ft. road grader.

The machine was purchased by the county primarily to haul road material and was equipped with a steel dump

Motor Vehicle Traffic in Minnesota

State Highway Department Determines Percentage of Motor Vehicles by Taking Traffic Census

The ratio of motor vehicles to the total number of vehicles using Minnesota state roads has been determined by a traffic census made by employees of the State Highway Commission, and will be used by C. M. Babcock, State Highway Commissioner, in urging upon the Legislature an increase in the license fees for pleasure cars.

"License fees in Minnesota now are \$5 for three years," said Mr. Babcock, "a really ridiculously low figure. The amount should be at least \$5 a year, and most motorists would gladly pay this and more for the privilege of better



A White "Good Roads Truck" in Operation in Grant Parish, Louisiana.



A 5-Ton Kelly Truck Used by the Road Officials of Warren County, Mississippi.



A Kissel Truck in Operation in Washington County, Colorado.

BUILDING ROADS WITH MOTOR TRUCKS—MACHINES USED TO HAUL ROAD GRADERS IN VARIOUS STATES.

body and hydraulic hoist. The experiment was entirely satisfactory and the truck was used continuously, being employed for grading when not required for hauling road material.

One of the accompanying illustrations shows the machine in operation. The other two illustrations show similar uses of the motor truck. One is a 5-ton Kelly machine used by the authorities of Warren County, Mississippi. The other is a White truck owned and operated by the authorities of Grant Parish, Louisiana.

roads. We have been way behind other states in this regard and we cannot hope to keep up with them in providing good highways unless this matter is radically changed. License fees now extant run until 1921, and this department will ask the Legislature, which meets next January, for a law increasing the fee to a figure closer to that charged motorists in other states."

On State Road No. 1, a highway leading from Dakota County into St. Paul, it was found that 80% of the vehicles using the road were automobiles. The census was taken

on nine days from 5 a. m. to 10 p. m., and showed a daily average of 516.8 automobiles, 30.8 motor trucks, 19.1 heavy teams and 37.7 light rigs.

Importance of Skillful Driving

Efficiency of Truck Operation Depends Largely on Efficiency of the Operator

The efficiency of truck operation depends very largely upon the skill of the driver, according to C. T. Silver, metropolitan distributor for the Kissel Motor Car Co. The more a driver knows about the truck he is driving, the greater his ability to handle it correctly and the more likelihood there is that he will keep it on schedule time and avoid breakdowns or accidents.

"It is a patriotic duty for every motor truck owner to see that his truck drivers realize the importance of driving efficiently," says Mr. Silver. "By the owner spending a little time and money to bring his drivers up to a high point of efficiency, he is not only paving the way for greater profits to himself as well as higher pay for his drivers, but he will be able to lower the cost to the shipper, give better and quicker service and economize on gasoline and oil."

Distances Required for Emergency Stops for Trucks and Passenger Cars

The results of experiments to determine the distance in which motor trucks and pleasure cars can be stopped are described by F. E. Ertzman, Executive Secretary of the Motor Truck Owners' Association, Chicago, Ill., in a recent issue of the "Motor Truck Club Bulletin," published by the Motor Truck Club of America, Inc., of New York, N. Y.

The tests were made on State and Dearborn Sts. between 22nd and 25th Sts., Chicago. They were made on an asphalt pavement, which in the first set of tests was dry and in the second set wet. In the first set of tests a 2-ton truck, a ½-ton truck and a 6-cylinder touring car were used. In the second test the same car and trucks and additional trucks, one of 2 tons and one of 3 tons capacity, were employed. In each case the test was made by starting the cars abreast and applying the brakes as soon as a speed of 15 mi. per hour had been attained.

In the test on the dry pavement, the 2-ton truck was stopped in 19 ft., the ½-ton truck in 23 ft., and the touring car in 19½ ft. In the test on the wet pavement, the 3-ton truck was stopped in 48 ft., one of the 2-ton trucks in 55 ft. and the other in 52 ft., the ½-ton truck in 61 ft., and the touring car in 73 ft. It will be noted that in both cases the heavier truck was stopped in lesser distance and that on the wet pavement the touring car required a considerably greater distance than any of the trucks.

The trucks used in the tests were equipped with solid tires and the touring car with plain tread pneumatic tires. The rear tires of the 3-ton truck were 36x5-in. dual tires; on the 2-ton trucks 36x4-in. dual tires, and on the ½-ton truck 36x3-in. single tires. The touring car was fitted with 37x5 in. pneumatic tires, inflated to a low air pressure, which allowed them to flatten out somewhat, thus giving greater surface than if inflated to the proper capacity.

In discussing the results of the test, Mr. Ertzman stated that the tendency of the lighter machines to skid was much greater on the wet pavement, making it almost impossible to keep them from turning completely around when the brakes were applied. The lighter machines skidded from the middle of the street to the curb, while the large trucks skidded only 2 or 3 ft.

Steel and Fuel Supplies for the Motor Truck Industry

War Industries Board Gives Out Results of a Recent Hearing Given Motor Truck Manufacturers

At a hearing before Edwin B. Parker, Priorities Commissioner, and other representatives of the War Industries Board, at which a committee representing the motor truck industry of the United States presented the claims of the industry to preference treatment in its supply of raw materials, especially steel and fuel, the following conclusions were tentatively reached:

1. That motor trucks, in so far as they are used directly or indirectly for war purposes, are war essentials and their production must be facilitated accordingly.

2. That in so far as motor trucks are employed in civilian industries for essential uses they constitute an important transportation medium and their curtailment for such uses should be avoided as far as practicable.

3. That there exists in the industry, as in many others, an element of non-essentiality because of the uses to which its products are devoted, and a plan has been devised and will be put into effect promptly to insure against the manufacture or delivery of motor trucks for any other than essential uses.

Regardless of the point of essentiality, however, the War Industries Board does not undertake to guarantee to the industry any proportion of its steel requirements.

4. Steel and other war materials may be conserved through the observance by manufacturers, retailers and operators, of the strictest supervision of the use of motor trucks by maintaining and repairing each vehicle for operation as long as possible before replacing it with a new one and by observing other economies which were discussed and will be further developed.

5. The manufacturers and dealers fully realize that steel is today the world's most needed metal and that, in view of the urgent war demands of this nation and the Allies, it is well nigh treasonable to consume a pound of it that can be saved. With this in view, the manufacturers and dealers pledged themselves to reverse their practices of normal times, and, instead of selling through solicitation as many trucks as possible and furnishing new trucks to replace old ones, to use their utmost endeavor to induce owners and operators to repair and use the trucks they have as long as possible, to operate them fully loaded, and through shifts of drivers and otherwise, to keep them in use during the greatest possible portion of each day, to the end that each unit will perform a maximum of service and thus reduce proportionally the necessity for building new trucks.

The State Roads Commission of Maryland will receive \$1,500,000 from the sale of 4½% bonds by the state, and will use the money for the repair of roads and the reconstruction of bridges. Maryland roads have been badly damaged by the heavy traffic of army trucks, and the Roads Commission has frequently been urged to put the roads back into condition. The funds will be used solely for that purpose, no new construction being undertaken.

The Expenditure of Over \$600,000 on Roads on the East Michigan Pike during the past year, was recently announced by State Highway Commissioner Frank F. Rogers at a road meeting at Tawas Beach. The work was done on about 65 mi., and was done under the Covert Act and under the Federal Aid Road Act. At present about 25 mi. of Covert Act roads are under construction at an estimated cost of \$197,000, while 37.5 mi. of federal aid roads are under construction at an estimated cost of \$300,000.

MEETINGS

Calendar of Coming Meetings

Aug. 7-9—North Carolina Good Roads Association.—Annual convention, Wilmington, N. C. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Oct. 7-9.—American Association of State Highway Officials.—Annual meeting Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Association of County Commissioners of Pennsylvania

The Association of County Commissioners of Pennsylvania will hold a convention at the William Penn Hotel, Pittsburgh, Pa., Tuesday, Wednesday and Thursday, Aug. 6, 7 and 8. Road matters will be the principal topics discussed. A. C. Gumbert, President of the Board of County Commissioners of Alleghany County, has charge of the arrangements for the meeting.

PERSONAL MENTION

P. G. Ekman has resigned as City Engineer of St. Augustine, Fla., to accept a position as resident engineer on Federal Aid Project No. 1 in Florida.

R. D. Goodrich has resigned as City Engineer of Lansing, Mich., to go to China where he will be engaged in making surveys, plans and specifications for canal work.

W. S. Gearhart, State Highway Engineer of Kansas, has been commissioned a captain in the U. S. Engineers' Reserve Corps and has been ordered to Camp Lee, Va.

J. L. Thayer has resigned as Deputy County Engineer of Lincoln County, Washington, to become associated with the F. W. Anderson Mortgage & Investment Co. of Spokane.

H. S. Shorey has been appointed County Engineer of Grays Harbor County, Washington, to succeed the late George D. Robertson. Mr. Shorey was formerly Assistant County Engineer.

M. W. Watson, Road Engineer of the Kansas State Highway Commission, has been made Acting State Highway Engineer in the absence of W. S. Gearhart, who has been commissioned a captain in the Engineers' Reserve.

Horace H. Esselstyn has resigned as Resident Engineer of the Emergency Fleet Corporation at Hog Island, to become Commissioner of Public Works of Detroit, Mich. Mr. Esselstyn succeeds George H. Fenkell who resigned to become engineer for the Water Works Bureau.

Guy G. Harvey has resigned as County Engineer of Lincoln County, Washington, to become construction engineer for the Board of Commissioners. Mr. Harvey will continue to supervise the work of the county engineer's office, and the vacancy created by his change of position will not be filled until after the fall elections.

Prof. Frederic Bass, head of the department of civil engineering at the University of Minnesota, has been appointed Acting Secretary of the American Association of Engineers.

George H. Ruhling has resigned as Office Engineer in the City Engineer's office at Flint, Mich., to become Resident Engineer for the city of Highland Park, Mich., on the building of a filtration plant.

L. H. Fortier, formerly Superintendent of Streets of Moose Jaw, Saskatchewan, and later with the Imperial Munitions Board of Toronto, Ont., has joined the Toronto sales department of the Canadian Fairbanks-Morse Co., Ltd.

Maj. Henry Welles Durham, formerly Chief Engineer of the Bureau of Highways of the Borough of Manhattan, City of New York, is now in active service on the French front, according to a recent communication to friends in New York.

Prof. Robert C. Terrell, head of the department of highway engineering at the University of Oklahoma, has been appointed a major of infantry in the Oklahoma National Guard. Prof. Terrell was formerly State Highway Commissioner of Kentucky and a captain in the ordnance department of the National Guard of that state. He went to the University of Oklahoma in 1916, and was made a major on the staff of Governor Williams of Oklahoma in 1917. Upon the inauguration of military drill at the university he was made commandant of the cadet corps and is now in charge of military training at the summer session.

LETTER TO THE EDITOR

Highway Work in Monroe County, New York in 1918

Editor, "Good Roads":

It appears evident that the highway work in Monroe County during the year 1918 will compare favorably with that done in any other year and probably exceed it notwithstanding the fact that state highway work in this county is practically stopped except for maintenance, and the people of Monroe County are doing their full duty in the production of food as well as money for Government securities, and notwithstanding the difficulty of securing labor for highway work in competition with the huge munition factories located in Rochester.

Everybody here is enthusiastic in helping the nation to prosecute the war to a fitting ending, but they are thoroughly impressed with the fact that in order to accomplish what is laid upon them to do, it is very necessary to continue our highway work to the extent of making it possible to move our manufactures, people and food around.

J. Y. McCLINTOCK,

County Superintendent,

Rochester, N. Y.

Monroe County.

The Counties of Michigan are to receive \$773,590.90 from the state distribution of motor vehicle license money. This amount represents one-half of the fees collected, the other half going to the state.

Clay County, Missouri, has voted a \$99,000 bond issue for the construction of 63 mi. of road. The money is to be used on the road from Kansas City to Excelsior Springs, the road from Liberty to Holt via Kearney, and the Jefferson Highway from North Kansas City to Smithville.

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NEW YORK, AUGUST 10, 1918

Number
1

The Wauhatchie Pike

Opening of New Route Into Chattanooga, Tennessee

By H. F. WILTSE*

Hamilton County, Tennessee, and Chattanooga, its county seat, have for many years been widely and favorably known for good roads. This is equally true of the entire district, including Chickamauga Park, where the Government maintains a fine system of roads. One of the most notable improvements in the highway situation has been the great betterment of grades effected in the entrances to Chattanooga from various directions.

Until a few years ago, the only way of getting into Chattanooga from the east was by climbing Missionary Ridge; from the north, Stringers Ridge had to be traversed in like fashion, and from the west, while the road over the ridge

was good, it included a pretty stiff climb over a bench of Lookout Mountain. Since the completion of what is popularly known in Hamilton County as the Wauhatchie Pike, all of these excessive grades have been removed and the thresholds of Chattanooga are practically level. All the approach roads are in splendid condition. Early in 1918, on account of the large military camp at Chickamauga Park, the Government built a concrete road several miles long from the end of Rossville Boulevard to the army post. In the first two instances described the good result was secured by tunnels through Missionary and Stringers Ridges, respectively. In the case of the Wauhatchie Pike the steep grade was eliminated by building a new stretch

*Secretary, Chattanooga Chamber of Commerce.



VIEW ON THE WAUHATCHIE PIKE LEADING TO CHATTANOOGA, TENN.

of road nearer the valley level. This new stretch of road has just been dedicated with ceremony, and will stand as one of the finest pieces of engineering and highway construction in the vicinity. The road extends from St. Elmo Ave. to Lookout Station in the Wauhatchie Valley and runs for a distance of 2½ mi. Under the plans prepared by County Engineer Bryan, the grade at no place exceeds 5%, and in most places is less than that. In order to reduce the grade it was necessary to do a great deal of cut and fill work. The road is paved with concrete for its entire length, and is 20 ft. wide on the tangents and 25 ft. on the curves. The concrete is 7½ in. thick in the center of the roadway and 7 in. at the curbs. One of the most difficult pieces of engineering ever attempted locally was the building of the road around Jonas' bluff. This bluff was directly over the Lookout Mountain tunnel and necessitated the construction of a concrete wall 40 ft. in height.

The road is legally known as the Lookout Mountain Pike. It is officially known as the Chattanooga-Birmingham Highway and commonly and familiarly the Wauhatchie Pike.

To date there has been expended in county funds, including the cost of all rights of way, the sum of \$161,230.52.

The dedication was marked by a large assemblage, showing the interest of the citizenship in good roads and significant of the many elements that enter into highway improvement. The principal addresses were made by Judge M. M. Allison, President of the Dixie Highway Association; E. D. Reed, President of the Chattanooga Automobile Club; H. F. Lawrence, County Pike Commissioner of the Hamilton County Court; Maj. T. M. Ripley, United States Army Constructing Quartermaster, Chickamauga Park, formerly a division engineer of the New York State Highway Department, and A. M. Nelson, State Highway Engineer of Tennessee.

Apparent Specific Gravity of Fine Non-Bituminous Highway Materials*

Tentative Tests Proposed by Committee D-4 of the American Society for Testing Materials for Sand, Stone and Slag Screenings and Similar Materials

The following tests, "Le Chatelier" and "Jackson" are equally suited for use in determining the apparent specific gravity of sand, stone and slag screenings and other fine non-bituminous highway materials and may be considered as alternates:

Le Chatelier Test

The determination of specific gravity shall be made with a standardized Le Chatelier apparatus which conforms to the requirements illustrated in Fig. 1. This apparatus is standardized by the United States Bureau of Standards. Kerosene, free from water or benzine, not lighter than 62 deg. Baumé, shall be used in making this determination.

(a) The flask shall be filled with either of these liquids to a point on the stem between zero and 1 cu. cm. and 64 g. of sand or other fine non-bituminous highway material, of the same temperature as the liquid, shall be slowly introduced, taking care that the material does not adhere to the inside of the flask above the liquid and to free the material from air by rolling the flask in an inclined position. After all material is introduced, the level of the liquid will rise to some division of the graduated neck; the difference between readings is the volume displaced by 64 g. of the material.

The specific gravity shall then be obtained from the formula

$$\text{Specific gravity} = \frac{\text{Weight of material (g)}}{\text{Displaced volume (cc.)}}$$

(b) The flask, during the operation, shall be kept immersed in water in order to avoid variations in the temperature of the liquid in the flask, which shall not exceed 0.5° C. The results of repeated tests should agree within 0.01.

Jackson Test

The determination shall be made with a Jackson specific gravity apparatus (illustrated in Fig. 2) which shall consist of a burette with graduations reading to 0.01 in specific gravity, about 23 cm. (9 in.) long and with an inside diameter

of about 0.6 cm. (0.25 in.) which shall be connected with a glass bulb approximately 13 cm. (5.5 in.) long and 4.5 cm. (1.75 in.) in diameter, the glass bulb being of such size that

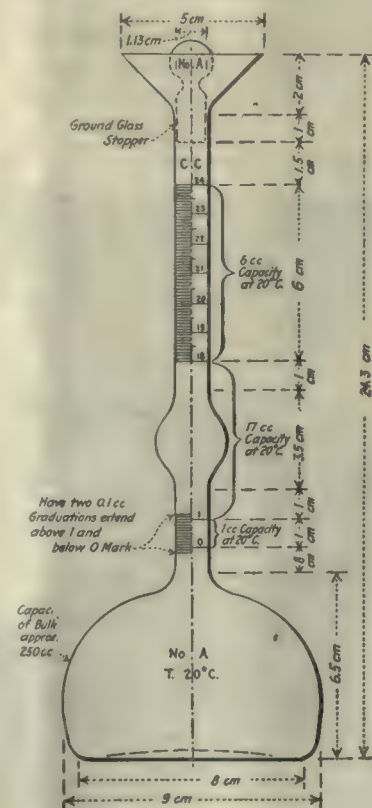


Fig. 1.

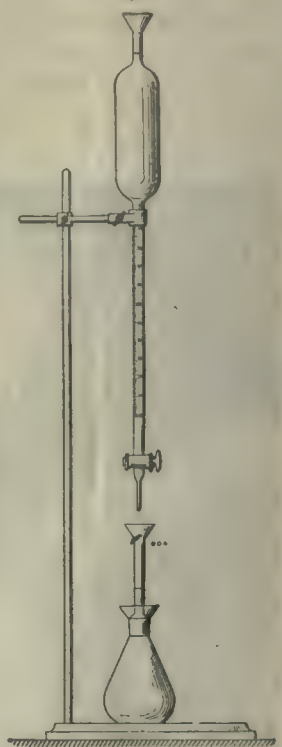


Fig. 2.

APPARATUS FOR LE CHATELIER AND JACKSON TESTS.

from a mark on the neck at the top to a mark on the burette just below the bulb the capacity is exactly 180 cc. (6.09 liquid oz.); and an Erlenmeyer flask, which shall contain a hollow ground glass stopper having the neck of the same

(Continued on page 52)

*From the report of Committee D-4 on Road Materials of the American Society for Testing Materials, presented at the twenty-first annual meeting at Atlantic City, N. J., June 25-28, 1918.

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

August 10, 1918

TRANSPORTATION

Perhaps some day a master of the pen who can dress up facts to look like fiction will tell the story of a man's day in terms of transportation. If that ever does happen, the average man may gain at least a faint realization of what transportation means to him and to the human race.

Beginning with the newspaper and the milk left at the ordinary citizen's door in the morning and ending with the pillow on which he lays his head at night, the story will bring home to the reader an understanding of his dependence upon waterways, railways and highways for everything he uses. Then he will think of his morning coffee—for a moment, at least—not as a brew of berries from the corner grocery, but as a drink for which the foundation was brought overland by trail and rail, down rivers and across oceans, over country roads and through city streets. He will visualize the thousands of miles of transport involved in bringing to his table even the simplest of breakfasts; he will follow in his mind the divers goings and comings of men to produce the clothes he wears; he will picture the converging trails from mine, forest and field, over which there have been brought the component parts of the innumerable things he uses in his day's work.

Only such a word picture will ever drive home to the rank and file of humanity the fact that transportation systems make up the foundation of every-day life; that without them we would be no further advance than savages in the wilderness. Nothing else can ever so forcefully illustrate

man's dependence upon the agencies that fetch and carry for him, can make him so fully appreciate his debt to those of his fellows who establish and care for the routes of trade and travel.

When this story has been written—possibly in a connected narrative like that outlined, but more likely in a multitude of word sketches—the people and those set in authority over them may comprehend the tremendous possibilities in the nation's highways. The roads are there, some ready for use and some yet to be put into usable condition, but all having a potential value, literally incalculable and immeasurable.

Good roads are said to have saved France. What can they not do for America?

MEETING CONDITIONS

Haste is apt to make waste, and in ordinary times it is well to sacrifice speed to careful, thorough work that will justify itself by a structure of greater durability and greater suitability for the service it is to render.

But these are not ordinary times. Unusual conditions must be met, and, while nothing but the best attainable under the circumstances should be considered good enough, road builders may have to modify their methods in order to meet conditions.

This is especially true of maintenance work, for it may often be necessary to adopt various expedients to keep the existing improved roads usable. In construction work, too, the same principle is likely to find application. The improvement of sections of road may be necessary to open up routes consisting chiefly of improved roads. And in this work the laying of temporary surfaces may have to be resorted to because of lack of the necessary labor and materials for work of a better class.

In the work of engineers in warfare the important element is time. It is not necessary for the military engineer to build elaborate, durable structures; he is called upon to provide something that will answer the purpose and that can be built in the least possible time. He must build for the present, not for the future.

Somewhat similar principles probably will have to be observed in a part of the road work American engineers are now called upon to do. The chief conflict of armed forces in the present war is on the fields of France, but the real battlefield embraces almost all the earth. Conditions here are comparable, in a way, to those faced by the builders of roads back of the lines, and the American highway engineer must see that fact clearly if he is to do his full duty.

To say that this or that "will win the war" is less than a half-truth, for no one factor alone will decide the issue. Neither men nor money, ships nor supplies, transportation nor agriculture, munitions nor food, can bring victory. We shall win, of course, but we shall do it only by coordinating every means at our command.

One of these means is transportation, and, because conditions in this country are what they are, highway transportation will be one of the foundation stones in the structure of coordination and cooperation that we must rear.

With the production of essential commodities speeded up to the last notch, we are confronted by the necessity of moving vast quantities of raw materials and manufactured products—and of moving them promptly. There is every reason, too, for moving them with the utmost attainable economy of labor, carriers and motive power. But while cheap transportation must be had, if possible, we can not afford to make any considerable sacrifices of time in order to save money. The goods must be moved, at whatever cost is necessary.

Because this is the situation, the highway engineers must provide the roads. Scarcity of needed materials of con-

struction, labor shortages, transportation tie-ups, and a thousand and one difficulties prevent carrying out the work in accordance with peace-time standards. Under these conditions the work must be done as best it can, keeping always in mind the one essential consideration—to keep the traffic moving.

In France, we are told, road work—especially maintenance—has been reduced to its simplest terms; a roadbed is built by throwing in any available material that will hold up a

truck. We have come to no such straits in this country, but we must be ready to adopt, if we need to, something of the rough and ready practice of the men who have saved France—and all civilization—by keeping open the lines of communication.

American road builders have an honorable and a responsible part to play in the defense of humanity. They must adapt themselves to the conditions under which they will have to play it.

The Efficiency of a Man

Rating Schedule for Division Engineers of the Kentucky Department of Public Roads

By RODMAN WILEY*

Everyone is aware of the fact that an enormous amount of human energy has been expended in order to bring the agencies of man to the highest point of efficiency. For example, such things as the telephone, telegraph, induction motor, automobile, steam engine, etc., have been highly developed, but there are yet some things which might be done to increase the efficiency of man.

Few men, comparatively speaking, have clearly defined duties; they work principally according to their own ideas, often wasting time and energy. Men are usually employed on the recommendations of others in whom we have confidence; frequently they are secured because they happen to suit the fancy of the one in charge, and rarely is a man delegated specific duties so that he may know what his superiors expect of him, or to be more explicit, he does not know the stress which is laid on each part of his work and consequently his success in any concern depends, in a large measure, on the impression that is created on the employer. He may not be 50% efficient but may still retain his position. Some are discharged because they do not get anticipated results, and may not be advised as to their weak points. In such cases it might be argued that unfair treatment is administered.

Believing that men will become more efficient if they know more in detail exactly what is expected of them has led the Department of Public Roads of Kentucky to prepare the following schedule for the rating of all division engineers:

Quality	Percentage
Loyalty.....	16
Judgment.....	14
Surveys and estimates submitted.....	10
Construction.....	10
Ability to get results through fiscal courts.....	10
Improvement in division engineer from month to month.....	10
Reports.....	8
Dealing with inspectors so as to get results.....	8
Ability to create road sentiment.....	8
Proper attitude toward contractors.....	6
Total.....	100

The fact is appreciated that all highway departments would not prepare the same kind of schedule, because conditions in the various states would be different. Some might have a higher rating on some of the points noted and might even eliminate a great many of the headings. However, we find that it satisfies our requirements most admirably. Owing to the fact that conditions are so different in the various districts, it is hoped that a sufficient number of headings have been used to give all men an equal chance.

The chief deputies of the office report to the commissioner all information concerning the men which can be obtained from the records and from the inspection of the work.

* Commissioner of Public Roads of Kentucky.

Other information is gathered by the commissioner in various ways and he alone will prepare the final rating of the man. Every month there will be sent to each man his detailed rating, and none others will be advised. The entire proposition is done in a spirit of helpfulness rather than one of criticism. They can see each month where improvements are possible and desirable, and men of the right calibre will try to improve. Already a vast amount of good has resulted from the proposition. Before adopting the scheme it was laid before the division engineers and it met with their hearty approval.

It is my experience that highway engineers more than perhaps any other class of the profession must possess unusual qualifications. In a great many states, especially in Kentucky, they are compelled to meet and deal with fiscal courts, engineers and the people in general; they must possess a good knowledge of financing road projects and at the same time be thoroughly familiar with all the details of road work. Men in many other branches of engineering are not required to be so thoroughly equipped.

I believe that the time is not far distant when universities will carefully examine all students and make recommendations as to what they consider the proper course for them to take at college. Especially should this be true of engineers, because it makes no difference how much training some men receive they will never become successful engineers.

Financial Aid for Texas Counties State Highway Commission Grants State and Federal Aid for Road Work

Several Texas counties were granted aid from state and federal funds at a recent meeting of the State Highway Commission. State aid allotments were made as follows:

Brazos County: Highway No. 2, not over \$3,490. Cherokee County: Jim Hogg Highway, increase from \$30,000 to \$40,000. Dallas County: Maple Ave. project, \$6,300 (two items); Highway No. 1, not over \$35,000; bridge on Highway No. 1, not over \$300; Highway No. 15, \$1,824.38. Fayette County: State Highway No. 3, not over \$2,970.20; same road, not over \$7,141.71. Johnson County: Meridian Highway No. 2, not over \$7,633.45. Randall County: Highway No. 19, not over \$8,265.

Allotments of federal aid were made as follows:

Dallas County: Highway No. 1, not over \$10,000; Highway No. 14, \$8,000; Highway No. 15, \$5,000. Fayette County: Highway No. 3, not over \$25,000. Hays County: Highway No. 2, not over \$658.50. Upshur County: Jefferson Highway No. 11, not over \$10,000.

At the same meeting the commission granted Dallas County the sum of not over \$13,000 from the automobile

revenues for the application of an asphaltic surface treatment on the King of Trails Highway No. 6, and the privilege of using not over \$13,000 from the maintenance funds for resurfacing work on Highway No. 15.

Marion County, Indiana, Awards Large Contract

Road From Indianapolis to Speedway City to be Built at a Cost of About \$173,000

The county commissioners of Marion County, Indiana, have awarded a contract for the construction of a road from 16th St. and Indiana Ave. to Speedway City to the Sheehan Construction Co.

The building of the road is in compliance with a request from the War Department that it be improved in order to facilitate the shipping of supplies to the aviation camp at the speedway. The road will be 30 ft. wide. The west half will be paved with concrete, and the east half with brick. The contract price is \$173,000, and the road is to be finished within 120 working days.

Federal Aid in New Mexico

Several Important Projects Agreed to by Federal Authorities

Several important road construction projects in New Mexico have been approved by the U. S. Department of Agriculture and cooperative agreements have been signed.

Among the projects are the survey and construction of the Cimarron-Taos Road, which will cost about \$30,000, and, according to present plans will be completed in 1920. The Government has allotted \$8,300 for 1918 work and the state and Taos County will provide an equal amount.

Other projects for which agreements have been signed include a portion of the Tijeras Canyon Road, which will cost about \$24,000 and the Hondo-Mescalero Road, which will cost about \$86,000.

A 4.2-mi. section of the Glorieta-Panchuela Road is to be built by the state and the U. S. Forest Service. The state will appropriate \$5,000 and the Forest Service \$15,000.

Status of Federal Aid in Iowa

Projects Involve Expenditure of About \$1,500,000 on About 335 Miles of Road

Up to July 3, according to a report by Road Engineer F. R. White of the Iowa State Highway Commission, printed in the "Service Bulletin" of the commission, project statements for 21 projects on which federal aid was requested had been submitted to the Office of Public Roads and Rural Engineering of the U. S. Department of Agriculture. Of this total 16 were approved, 1 was rejected and 4 were pending at the date of the report.

"The 21 projects for which statements have been approved by the commission and submitted to the Office of Public Roads," according to Mr. White's report "contemplate the improvement of 335.85 mi. of road, or an average of 15.98 mi. per project. The improvements proposed consist of constructing 307.35 mi. to finished grade, reshaping 28.5 mi., surfacing 105.95 mi. with gravel and surfacing 12.3 mi. with a pavement. There will be built to finished grade but not surfaced, 217.6 mi.

"The reconnaissance estimate of cost of these 21 projects is \$1,534,225.70, of which \$483,157.99 is from federal aid funds, \$483,157.99 is from state aid funds and \$567,909.72 is to come from county funds.

"The federal aid allotted to Iowa for the fiscal years ending July 1, 1917, and July 1, 1918, amounts to \$438,526.80, so that the federal aid requested in the 21 project statements

approved by the commission during the past year exceeds the first two years' apportionments of federal aid funds by \$44,631.19. The federal aid apportioned to Iowa for the third year, that is, the fiscal year ending July 1, 1919, is \$434,653.61. This sum becomes available for expenditure July 1, 1918, so that there is now available \$390,022.42 of federal aid funds against which no project statements have been approved by the commission. The same rate of progress in the preparation and approval of project statements during the next year as was made during the past year will more than take up this fund."

New Jersey Road Work

State Highway Commission Awards Contracts for Important Improvements

The New Jersey State Highway Commission, upon recommendation of State Highway Engineer Thompson, has awarded a number of contracts for the improvement of important roads in the state highway system.

A contract for the construction of about 5 mi. of grading and drainage on route No. 3 in Camden County has been awarded to Black & Klocker of Trenton, for \$75,381.20. The engineer's estimate for the work was \$78,619.80. A contract for the construction of another section of route No. 3, about 3 mi. in length, has been awarded to Ralph Sangiovanni of Newark, for \$143,282.40. The engineer's estimate was \$118,503. A contract for the construction of about 5 mi. of road on route No. 2 in Burlington County has been awarded to the Utility Construction Co. of New Brunswick, at \$292,628.07. The engineer's estimate was \$243,486.60.

Pennsylvania War Roads

State Highway Commissioner O'Neil and Lieutenant Governor McClain Inspect Roads Used for War Purposes

State Highway Commissioner J. Denny O'Neil of Pennsylvania has recently finished an inspection trip over the war roads in the state. He was accompanied on Thursday and Friday of last week by Lieutenant Governor McClain, who is in charge of expenditures for war road purposes for the Pennsylvania Council of National Defense.

Upon the advice of Lieutenant Governor McClain the council has made an additional appropriation of \$50,000 for the improvement of bad stretches of road in Osborne Borough, Allegheny County, and in Economy Township, Beaver County, each locality getting \$25,000. Both sections of road are on the direct route used by Government truck trains and are almost impassable. As neither section is on a state route, the State Highway Department is unable to expend money for their improvement, its funds being specifically appropriated for use on state highways. Neither Osborne Borough nor Economy Township is able to finance the work, as each has reached its limit of indebtedness.

Last winter the Pennsylvania Council of National Defense appropriated \$500,000 for the improvement of main routes essential to aiding the Government's war work.

Two bridges of the Lincoln Highway were found to be in dangerous condition and will be repaired. One is situated in Westmoreland County and repair work has been started by the Highway Department in cooperation with the county, under the direction of Willis Whited, Bridge Engineer, and J. E. Sampson, Superintendent, of the State Highway Department. The county will bear the cost. The other structure is the Legionville Bridge in Beaver County. It is stated that unless the county authorities make the necessary repairs, the State Highway Department will make them and charge the cost to the county.

Apparent Specific Gravity of Fine, Non-Bituminous Highway Materials

(Continued from page 48)

bore as the burette, and shall have a capacity of exactly 200 cc. (6.76 oz.) up to the graduation on the neck of the stopper.

The method is as follows:

(1) Dry at not more than 100° C. (230° F.) to a constant weight a sample weighing about 55 g.; (2) weigh 50 g. of the dry sample to 0.1 g. and pour it into the unstoppered Erlenmeyer flask, which shall be cleaned and dried before each determination; (3) fill the bulb and burette with kerosene, leaving just space enough to take the temperature by introducing a thermometer through the neck; (4) remove the thermometer and add sufficient kerosene to fill exactly to the mark on the neck, drawing off any excess with the burette; (5) run into the flask about one-half of the kerosene in the bulb to remove air bubbles and then run in more kerosene, removing any material adhering to the neck of the flask until the kerosene is just below the ground glass; (6) place the hollow ground glass stopper in position and turn it to fit tightly and then run in kerosene exactly to the 200-cc. (6.76 oz.) graduation on the neck, care being taken to remove all air bubbles in the flask; (7) read the specific gravity from the graduation on the burette and the temperature of the oil in the flask, noting the difference between the temperature of the oil in the bulb before the determination and that of the oil in the flask after the determination; (8) make a temperature correction to the reading of the specific gravity in accordance with the table furnished by the manufacturer of the apparatus, adding the correction if the temperature of the kerosene has increased and subtracting it if the temperature of the kerosene has decreased.

Road Repair by the Government

War Department Said to be Investigating the Situation with a View to Stating Federal Policy

Pressure is being exerted upon the Federal Government to bring about its participation in the repair of roads used by army trucks, and it is stated that a statement of the War Department's policy may be expected in the near future.

Road officials and others in Virginia and Maryland have been especially active in urging that the Government take some action, and representatives of many states are said to have advised the War Department that their states have not sufficient funds to take care of the work. General Goethals, Chief of Transportation, is said to realize the seriousness of the situation and to have stated his intention of calling the matter to the attention of the War Department.

Road Work Charged to Railroads

Statement of the Attitude of the Railroad Administration Towards Participating in Payments for Road and Street Work

The U. S. Railroad Administration has recently issued Circular No. 44 setting forth its attitude toward participation in the cost of road and street work charged against railroads. The text of the circular follows:

"First.—Wherever street or road construction and other public improvements are contemplated by the authorities in any state, county, district or municipality, for which a portion of the cost in an amount exceeding five hundred dollars (\$500) is to be charged against any railroad under Federal control, the authorities are requested to take the matter up

with the federal management of the road directly interested and secure the concurrence of the Railroad Administration in advance.

"Second.—In the event this is not done the Director General will reserve the right to decide whether or not he will participate in the payment.

"Third.—It is not the attitude of the Director General to oppose construction of this character which is meritorious and essential. The Director General feels, however, that in the present stress as to the essential labor and material supply all work of this kind which can be postponed without injury should not be undertaken, and the railroad should not be expected to participate in the payment unless the expenditure is indispensable."

Traffic Regulations in St. Louis

Missouri Supreme Court Holds Invalid a City Ordinance Giving Policemen Arbitrary Power

A clause in the St. Louis traffic ordinance giving patrolmen arbitrary power over vehicle drivers has been declared invalid by the Missouri Supreme Court, and a new section has been enacted by the Board of Aldermen.

The new clause limits the orders of policemen to "reasonable directions" in controlling the movement of traffic and providing for the safety of pedestrians. The ruling of the court left the traffic ordinance intact with the exception of the one clause which, it is held, gives the police an unreasonable arbitrary power over the public. The parking regulations, one-way street rules and similar regulations remain in force.

In connection with the work for a "safety week" for St. Louis and the surrounding cities at the time of the meeting of the National Safety Council in that city, which was mentioned last week, the council has issued, through its St. Louis office, the following "two minute talk" which it plans to have published in the papers:

"Why is 'jay walking' always dangerous?

"Because a 'jay walker' crosses the street at an unexpected place—a place not anticipated by a driver!

"When he crosses intersections of streets diagonally.

"When he crosses between intersecting streets and not on the crosswalks.

"When he walks in the street instead of on the sidewalk.

"A 'jay walker' exposes himself to every passing vehicle."

The First Concrete Road in Washington County, Oklahoma, is under construction between Bartlesville and Dewey, a distance of approximately 3 mi. The road will cost about \$63,000 and it is expected that it will be completed by Oct. 1. It will be paved to a width of 18 ft., with a 3-ft. earth shoulder on each side.

State Highway Commissioner O'Neil of Pennsylvania has awarded a contract for the construction of a section of the Washington-Pittsburgh Pike to Hardy & Rankin of Canonsburg, Pa., for \$209,947.10. The section to be improved is on State Highway Route 108 in Washington County, Cecil and North Strabane Townships. It is to be paved for a width of 16 ft. with plain concrete and hillside vitrified brick.

The Board of Aldermen of St. Louis, Mo., is considering a bill proposed by the City Plan Commission for the opening of Skinker Road north of Delmar Ave. as far as Olive Street Road where it would connect with Hodiamont Ave., and form a new crosstown thoroughfare in the city. The plans call for a boulevard 80 ft. wide. It is stated that the measure is being supported by influential realty interests and that its passage seems probable after the summer vacation of the Board of Aldermen.

MOTOR VEHICLE TRANSPORTATION

Army Motor Truck and Passenger Car Standardization

War Department Announces Adoption of Four Principal Designs of Trucks and Three Types of Passenger Cars

The War Department has authorized the following statement relative to the standardization of motor trucks and passenger cars for army uses:

The standardization of cargo trucks and passenger cars for the use of the Army has been completed. More than 75,000 standardized trucks and passenger cars have been ordered. Four trucks and three passenger cars have been selected as suitable for the various requirements of all branches of the service that have need for motor transportation.

Of the four trucks selected, two are after designs worked out by special boards of automotive engineers. The other two are commercial trucks which have been changed to meet the special requirements of military work.

The $\frac{3}{4}$ -ton to 1-ton truck selected after exhaustive tests of a number of cars, including a model devised under the supervision of a special board of engineer, is the "G. M. C." truck, which is now known as Army Type AA. Changes have been made in the model used by the Government, the principal change being superior spring development. About 7,500 of these trucks have been ordered.

The $1\frac{1}{2}$ -ton to 2-ton truck selected, which after certain modifications is now known as Army Type A, is the White. The tests of cars in this class were by far the most severe, and by a process of elimination the Engineering Advisory Board was left with three trucks.

While the board reported that these three trucks were equally serviceable from a strictly technical point, the board of officers which received the findings recommended the adoption of the White for the following reasons: Lower gasoline and oil consumption, more satisfactory performance both in Mexico and France, and best adapted for high-speed work, with pneumatic tires for use as a staff observation and reconnaissance car and high-speed truck.

After competing with a number of well known makes in the 3 to 5-ton class, the specially constructed army truck of this class, known as Type B, was selected as the standard truck of this class with the recommendation that certain minor changes be adopted by the engineering department of the Motor Transportation Service.

For about a year the Engineering Ordnance Department has been working on an improved four-wheel drive type of truck. Several models were completed and two of these were tested in arriving at the recommendation that the Ordnance model be adopted as the standard for the Army.

This truck is known as Army Type TT, as it is really a tractor truck. It is especially suitable for the hauling of great guns over rough stretches of road or over open country. In many ways it has the ability of a tank to go over places generally considered impassable to vehicles. It is one of the distinct contributions of automotive engineers to the war.

In rejecting many trucks, the examiners stated that in no way was their act a reflection on the commercial value of these vehicles. The majority of trucks are made for city work, and as army trucks are called upon to do exceptionally heavy, rough work, commercial trucks could not stand up under the strain.

On account of the request from the American Expedition-

ary Forces for additional Ford machines, the Ford chassis (passenger) was adopted as a standard chassis for use of the Army to be used as a passenger car, light truck, light ambulance, and for whatever else desired.

Two other types of passenger cars have been selected for the use of the Army. In connection with the adoption of the passenger cars, it was found after exhaustive tests that the chassis as now being manufactured for the Army by the Dodge and Cadillac companies were best adaptable to Army needs. These are not the models now being marketed by those concerns, but a type with certain additions and deductions. These are to be produced in other factories if the needs of the Government require.

Electric Truck Operating Costs

Data from Thirty Days' Use of an Electric Truck in City Delivery Work

Data on the operation of an electric motor truck for a period of 30 days have been given by A. Jackson Marshall, Secretary of the Electric Vehicle Section of the National Electric Light Association. The truck used was a 750-lb. machine and was used in ordinary city deliveries for 30 working days. The figures as given follow:

Days operated	30	
Miles traveled	1,140.5	
Kilowatt hours used	319.5	
Number of miles per kilowatt hour	3.57	
Greatest current consumption for one day	13.	K.W.H.
Smallest current consumption for one day	10.	"
Average current consumption for one day	10.65	"
Shortest run	33.5	mi.
Longest run	46.5	"
Average run	38.01	"
Greatest merchandise load (overload of 750 lb.)	1,500	lb.
Smallest merchandise load	500	"
Average merchandise load (overload of 250 lb.)	1,000	"
Current cost per car mile at 3c. per K.W.H.	\$.008	
Current cost per car mile at 4c. per K.W.H.	.011	
Current cost per car mile at 5c. per K.W.H.	.014	
Maintenance (maximum estimate) including repairs, renewal of all mechanical and electrical parts, including tires, battery and painting of wagon, should not exceed per car mile	\$.04	

Higher Express Rates Mean Greater Use of Trucks

Case of the Cleveland and Akron Road Points to Widened Field for Highway Transportation

Increased express rates will result in a further extension of the use of motor trucks for short-haul shipments, in the opinion of F. H. McKinney of the Packard Motor Car Co.

"A splendid example of how trucks are shouldering some of the burden without hurting the express companies financially," Mr. McKinney says, "may be witnessed any day on the road between Cleveland and Akron. There motor truck traffic now amounts to 65% of all rail traffic between the two cities. This includes express and freight shipments.

"It almost follows as a matter of course that the Packard trucks entered in the \$5,000 national efficiency test are presented with a wonderful opportunity for increased efficiency by these higher rates.

"No doubt many a truck owner on looking over his national standard truck cost system will find that his truck has some idle hours during the day. He will want to make his truck work during those hours, especially when he begins to feel the pinch of paying higher express rates for hauling that his truck could do. That's when he'll begin to pay a great deal of attention to the return loads proposition.

"With all the war work, with the increase in railroad and

express rates, surely the slogan 'save a freight car for Uncle Sam' means more now than it ever did before."

Packard Truck Efficiency Competition Effects Gasoline Saving

One of the chief results accomplished by the truck efficiency test inaugurated by the Packard Motor Car Co., is said to be the saving in gasoline which has been effected. According to the Packard Co., observers who have been watching the trucks entered in the test, have failed to find a single truck left standing with the motor running.

The competition will end on the last day of August, but the company is sending out appeals to all Packard owners to continue indefinitely in order to save freight cars.

The company has also announced that because of the favorable comments on the truck cost system used in the test a copy of the system will hereafter be a part of the standard equipment supplied with each truck sold.

Motor Truck Traffic on the Cleveland-Akron Road

A traffic census on the Cleveland-Akron road recently completed by the B. F. Goodrich Co., shows an enormous increase in the amount of freight transported over the road by motor truck. According to the census, which covered a period of a week, the total volume of freight carried was 4,814 tons, in 1,349 loaded trucks. This represents a saving of 178 freight cars, assuming the average load for a freight car at 27.1 tons.

In addition to this saving, it is pointed out that the delivery of passenger cars and trucks under their own power resulted in a saving of 677 freight cars. The number of new passenger cars passing over the road for delivery to eastern and southern states was 883 and the number of new trucks 471.

A similar census was taken about nine months ago. The latest census shows an increase of about 140% over the previous one in tonnage carried by motor trucks. On the other hand the 1918 census shows a considerable decrease in passenger traffic.

PUBLICATIONS

NEWPORT, RHODE ISLAND, STREET AND HIGHWAY DEPARTMENT. Annual report of the Street Commissioner for the year 1917. Paper 6x9 in., 59 pp. and covers.

This report contains a detailed statement, largely in tabular form, showing the work of the Street and Highway Department. The work included comprises paving, sidewalk work, street cleaning, street sprinkling, the operation of the city quarry and crusher, sewer work, the care of bathing beaches and other miscellaneous work.

"TYPICAL SPECIFICATIONS FOR BITUMINOUS ROAD MATERIALS." by Prevost Hubbard, Chemical Engineer, and Charles S. Reeve, Chemist, Office of Public Roads and Rural Engineering, U. S. Department of Agriculture. Bulletin No. 691, U. S. Department of Agriculture, dated July 10, 1918. Paper, 6x9 in., 60 pages, and covers; illustrated.

The first part of this bulletin consists of a set of 30 typical specifications for the bituminous materials used in various kinds of road work, including the following: Petroleum products for dust laying, road oils for hot applications, road oils for cold applications, oil asphalts for construction, fluxed Bermudez and Trinidad asphalts for construction, tar for cold applications, tar for cold patching, refined tar for hot applications and refined tar for construction. The second part is devoted to descriptions of the methods of testing bituminous road materials, and the

third part consists of several paragraphs of directions for selecting and shipping samples for testing. The illustrations in the bulletin are reproductions of drawings of testing apparatus.

MEETINGS

Calendar of Coming Meetings

Oct. 2-4, American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Oct. 7-9.—American Association of State Highway Officials.—Annual meeting Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

PERSONAL MENTION

Clayton E. Bailey, Secretary-Treasurer of the Permanent Highways Corporation of New York, N. Y., died suddenly on Thursday, Aug. 8.

David C. Morrow, City Engineer of Washington, Pa., has resigned, and has been commissioned a captain in the Sanitary Department of the U. S. Engineer Corps.

Herbert E. Hudson, Division Engineer of the Chicago Board of Local Improvements, has been granted a leave of absence to become a division engineer in the Quartermaster's Department.

Clarence D. Pollock of Pollock & Taber, New York, has been appointed engineer for the housing projects of Elizabeth and Kenilworth, N. J., and Staten Island, N. Y., the work involving a total expenditure of about \$1,500,000.

J. F. Witt of Dallas, Tex., has been appointed chairman of the State Highways Transport Committee of Texas. The appointment was made by Judge O. E. Dunlap of the State Council of Defense in compliance with a request from the National Highways Transport Committee.

The New York State Defense Council has organized a highway transportation committee to encourage the establishment of rural motor express lines and return load bureaus. Peter G. TenEyck of Albany, has been made chairman.

The State Highway between Los Angeles and San Francisco, Cal., will be completed this fall, according to a recent report. The road was started five years ago, and was intended to be a connecting link between California's two world expositions. The road is about 500 mi. long and the last unimproved section, 24 mi. in length, is to be completed within a few months.

The Missouri State Highway Department is urging county officials and others interested in the improvement of the public highways of the state to cooperate with the Highways Transport Committee of Missouri in encouraging the establishment of rural motor express and return load bureaus. A. C. McKibbin, Secretary of the State Highway Commission, is chairman of the committee.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, AUGUST 17, 1918

Number
7

National Pavement in New Haven

Street Department of Connecticut City Lays Nearly 50,000 Square Yards
of Earth and Asphalt Pavement

During the present season and the season of 1917, portions of six main thoroughfares in New Haven, Conn., have been paved with National pavement. Work now nearing completion will bring the total area to 50,000 sq. yd. Some of it has been laid on concrete foundations and some has been used as resurfacing over both old macadam and old brick pavements. Because of the opportunity afforded to study these different types of construction, and because of the nature of the pavement and the claims made for it, the New Haven work is of unusual interest.

is added to the aggregate after the latter has been simultaneously pulverized, dried and heated.

The chief points in which National pavement differs from other mixed bituminous pavements are the character of the aggregate and binder and the proportion in which they are combined, and the claims for the pavement's superiority are based upon these features. In the manufacture of other types of asphalt pavements, sand and crushed rock as the aggregate, and hard, low penetration asphalt as the binder, are used.



LAYING CONCRETE FOUNDATION FOR NATIONAL PAVEMENT ON MECHANIC ST., NEW HAVEN, CONN.

National pavement contains only two ingredients—finely divided earthy material and soft asphalt. The earthy material used in the New Haven work is a clayey soil consisting very largely of disintegrated red sandstone. Other earthy material, such as sandy soil or loam, may be used, however. This is one of the distinctive features of the pavement and an especial advantage at present when the use of local materials is so necessary. The binding material is soft asphalt, that is, an asphalt of high penetration. The finished mixture consists of about 80% of aggregate and 20% of binder, combined in a special machine in which the heated asphalt



NATIONAL PAVEMENT ON OLD MACADAM ON EDWARDS ST., NEW HAVEN—LAID IN 1917.

The prime requisite of a pavement surface is, of course, ability to withstand heavy modern traffic and the elements. In addition a pavement must present a surface that has sufficient resiliency to insure the comfort of users, must not be slippery, and must be easily cleaned and readily repaired.

The ability of a pavement to withstand abrasion from the effect of traffic depends upon the durability of the materials entering into its composition and the stability of the mixture. Obviously, one of the chief causes of failure is the breaking up of the particles of the aggregate under the pounding and grinding effect of heavy modern traffic of both



DUMPING TRUCK LOAD OF NATIONAL MIXTURE ON CONCRETE BASE—MANSFIELD ST., NEW HAVEN.

steel and rubber tires on high-speed vehicles. In order to overcome this the aggregate used is pulverized to such a fineness that over two-thirds, by volume, will pass a 200-mesh screen. This, it is held, makes further reduction by traffic practically impossible. It is also pointed out that the aggregate is further insured against disintegration from the effect of the elements by driving out all free moisture before it is mixed with the asphalt. The claim of long life of the binder is based on the large percentage used and its high penetration. The soft asphalt is non-brittle, and, mixed with a non-fracturing aggregate, produces a paving material that combines both of these desirable qualities. It is argued that this soft asphalt has a much longer life than a harder material, and as proof of the greater durability of such a soft binder, attention is called to the French asphalt pavement, composed of fine mineral matter impregnated by nature with the same kind of soft (high penetration) asphalt binder, that has been in service in New Haven for 22 years and is still in good condition.

Soft asphalt has not been subjected to as much heat in the refining process as hard asphalt which is used in making other types of asphalt pavements. Excess heat in the process of refining shortens the life of asphalt by volatilization and chemical action.

There is a further resemblance between National pavement and the French asphalt pavement in that both contain larger percentages of asphalt than are usual, the French asphalt containing from 10 to 13%, while the National pave-

ment contains 20%. Ordinary sheet asphalt and asphaltic concrete contain from 7 to 10%.

The same characteristics that insure durability under traffic are cited as the cause of National pavement's ability to withstand the elements. It is claimed that the minuteness of the particles of absorbent earthy matter results in a much more intimate mixture of binder and aggregate than is ordinarily obtained where aggregates of sand or crushed rock are used, thus insuring stability, and that the high penetration asphalt surpasses a harder bitumen in its ability to withstand disintegration by water and volatilization by temperature changes.

Asphalt slowly volatilizes, in time, when mixed in a free condition with sand and rock. It is claimed that the absorbent earthy material holds the large percentage of bitumen in "a chemico-physical condition similar to the chemically combined water held in a clay, permanently," the difference being that the soft asphalt is held by the natural affinity the asphalt has for the fine, dry earthy material. Practically all free moisture leaves earthy material under 300° F., while higher temperatures are required to dispel the chemically combined moisture. Asphalt cannot be separated from earthy dust by heat. It is a non-flowing material. The asphalt will not separate from the earthy material under the effects of mechanical action, heat, or water. A plastic, malle-



ROLLING NATIONAL PAVEMENT—FINISHED PAVEMENT IN FOREGROUND; SPREADING SURFACING IN BACKGROUND—MANSFIELD ST., NEW HAVEN.

able material does not crack like a flint-hard material, but on the contrary is a welding material even when cold.

While the finished pavement resembles sheet asphalt in appearance, it differs from it in several particulars. It is soft enough so that a knife blade can be readily inserted, but at the same time it has been found sufficiently tough and hard to retain its shape under heavy traffic and sufficiently plastic and malleable so that marks made by horseshoes iron out under further traffic. It presents a surface that is soft enough to provide a foothold for horses, but at the same time is hard and even enough so that it is kept clean by the rains. Earthy material tracked on does not penetrate the pavement. It does not bleed nor become sticky, because it is a non-flowing material, and does not vary greatly in hardness at different temperatures. The same qualities that enable it to retain its shape under traffic and to resume its original shape after deformation, make it easily repaired when openings have to be made. The pavement is not new, having been experimented with for ten years and in use for five years, during which time both the pavement and the machine for laying it have been developed to their present efficiency. It is the invention of M. A. Popkess, of Kansas City, Mo., to whom basic patents covering the product, the process and the machine have been granted. Mr. Popkess



RAKING NATIONAL MIXTURE ON MANSFIELD ST., NEW HAVEN, CONN.

has been ably assisted in the development work and promotion by J. Edgar Black, also of Kansas City.

The Permanent Highways Corporation, of which John K. Tener is president, 50 E. 42nd St., New York, N. Y., has acquired the patent rights for the United States and is promoting National pavement, except in four states.

The New Haven work comprises 21,300 sq. yd. put down in 1917 and about 28,700 sq. yd. of 1918 work. The work on Mansfield St., which has been completed recently, comprises 4,600 sq. yd. of National pavement on a 6-in. concrete base. The section paved is between Hillside Place and Division St., and is immediately adjacent to the plant of the Winchester Repeating Arms Co. The thickness of the surfacing is 2 in.

A similar pavement is being completed on Mechanic St., between Lawrence and Willow Sts. This comprises 4,600 sq. yd. of 2-in. top on a 6-in. concrete base. Mechanic St. is the main approach to the arms factory of the Marlin Rockwell Corporation.

The work has been done by the Franklin Contracting Co., 52 Vanderbilt Ave., New York, N. Y. Alexander Reed and W. A. Strothers control the company. This firm has already laid considerably over 75,000 sq. yd. of National pavement in Millburn, Glen Ridge, Belleville and Paterson, N. J.

Maryland Bond Issue Approved

Capital Issues Committee Authorizes \$1,500,000 Issue and Immediate Use of \$845,000

The Capital Issues Committee has authorized the issuance of \$1,500,000 of state bonds for road work in Maryland and has approved the use of \$845,000 for work at this time.

The principal work to be undertaken with the amount immediately available is the repair of the Elkton-Baltimore-Washington Road which is used to a very large extent by the Government. The amount approved for this work is \$550,000.

Among other items approved are \$85,000 for resurfacing roads over the Allegany County mountains, and \$50,000 for resurfacing a section of road which will connect the Maryland state highway system with the Valley of Virginia and will eliminate two dangerous railroad crossings near Knoxville.

War Basis for Automobile Industry

War Industries Board Advises 100% Curtailment in Passenger Car Manufacture

The War Industries Board has advised the automobile industry to discontinue the building of passenger cars by January 1, 1919. This action was taken after the automobile manufacturers had voluntarily agreed to curtail the production of passenger cars 50% beginning on August 1.

The decision of the board was stated in a letter to the National Automobile Chamber of Commerce, New York, N. Y. It was stated that while the offer of a 50% curtailment in the manufacture of passenger cars was a step in the right direction, it was only a step and that further curtailment was inevitable. Continuing, the letter said that fairness to the automobile industry compelled the board to state frankly that there would be little, if any, of the principal materials required in the construction of passenger cars available for non-war industries after the war requirement had been provided for. The board could not make any promises regarding the supply of steel, rubber or other materials for any definite period in advance, and it strongly believed it was to the best interest of the manufacturers to undertake "to get on 100% war work as rapidly as possible, and not later than Jan. 1, 1919."

Pennsylvania Toll Road Freed

Lancaster and Susquehanna Turnpike Taken Over by the State

The signing of the final papers by State Highway Commissioner O'Neil of Pennsylvania and officials of the Lancaster and Susquehanna Turnpike Co., has entirely freed the Lincoln Highway of the toll road nuisance between the Ohio state line and the New Jersey state line.

Within less than a year nearly 200 mi. of toll roads have been freed in Dauphin, Berks, Lebanon, Westmoreland, Fayette, Blair, Bucks, Fulton, Franklin, Montgomery, Delaware, Lancaster, York and Adams Counties. The roads have been purchased by the state with a fund of \$500,000 appropriated by the 1917 Legislature and funds contributed by the various counties in which the toll roads were situated, the county paying one-half of the cost in almost every instance.

There still remain about 308 mi. of toll roads in the state, of which 185 mi. are situated on state highway routes, the remaining being on county roads.

Plans of New York Defense Council

Increasing Traffic and Measures to Take Care of It Discussed at Meeting of New State Organization

Ways and means of utilizing the state highways of New York as auxiliaries of the railroads and waterways were discussed at a meeting of the new Highways Transport Committee of the New York State Defense Council in Albany on Aug. 7.

Former Representative Peter G. Ten Eyck, chairman of the committee, has made plans for the division of the State into districts with a representative of the committee in charge of the work in each one. Chairman Ten Eyck outlined his plans at the meeting and it is stated that the organization will be completed in the very near future.

George H. Pride, a member of the National Highways Transport Committee, was one of the chief speakers. Mr. Pride said that the time was coming when it would be necessary for this country to follow the example of England, where all traffic is under Government supervision. He said in part:

"In England it has gotten to a point where the Government can take over for immediate use any vehicle on the streets. The only thing that is not covered, and by that I mean is not immediately controlled, is the horse actually engaged in farm operations, which cannot be taken for Government work. All this may seem to you far removed from our present situation, but what I want to impress upon you is the idea that there is nothing that is impossible in the next six months in the form of control, if the situation comes to a point of force.

"In spite of the fact that the railroad administrator has been making every effort to care for the movement of freight, the volume of freight we have got to move the coming winter will be greater than last winter. Any increase in efficiency will be more than replaced by the excessive increase in freight. I have gone into this because I want to emphasize the very serious condition that our transportation facilities are in at the present time. We have a situation to be met, and the first thing to do is to meet it.

"The food administrator is exceedingly interested and also the Department of Labor. There is no question that the rural express must be developed and as a matter of fact we understand that railroad construction in general will be very much curtailed, if any is done whatever. So the increase will have to be handled by the highways."

Raymond Beck, Field Engineer of the National Highways Transport Committee, also addressed the meeting.

War Department Aids Georgia Road

Government Appropriates \$95,000 Toward Road to Rifle Range

The War Department has authorized the expenditure of \$95,000 as its share of the cost of building a road from Camp Gordon, Ga., to the Norcross Rifle Range.

The present road between the camp and the rifle range runs through clay and is frequently impassable for heavy trucks. The total cost of the improvement is estimated at \$190,000, and as the road is to be used chiefly by the military authorities, the department has agreed to meet a part of the cost. Of the balance, the State of Georgia will pay \$65,000, and DeKalb and Gwinnett Counties \$15,000 each.

Government Aid to Truck Makers

War Industries Board Issues Circular Outlining Assistance to be Extended to Manufacturers of Motor Trucks

A circular outlining the assistance which the War Industries Board will extend to motor truck manufacturers has been prepared for distribution by Edwin B. Parker, Priorities Commissioner of the board.

The circular states that, to the extent that motor trucks are used directly or indirectly for war purposes, they are war essentials; that their production for such purposes should be facilitated; and that in so far as trucks are employed for essential purposes in civilian industries they constitute an important transportation medium and the curtailment of such uses should be avoided so far as possible.

The priorities division of the War Industries Board will receive applications from truck manufacturers for place on the preference list for fuel. In considering each such case it will take into account the fuel needs of the manufacturer, the amount of his direct and indirect Government business and the use to which the remainder of his product is being devoted. Any manufacturer whose plant is now, or shall be in the future, devoted exclusively to making products for the Government or for other essential uses, may have his plant placed upon the preference list for fuel, if his fuel requirements and his output bear proper relations to each other, and if he will observe the pledge of cooperation required by the priorities board and the rulings of that body.

After pointing out the great demand for steel and the consequent necessity for its conservation, the circular states that any truck manufacturer whose plant is engaged in the production of trucks for the Government or for other essential uses, may be given a class B-4 rating for his steel requirements, if he will observe the pledge of cooperation and the rulings of the board. Formal application for a higher rating may be made for the steel necessary to complete any particular contract or order. The form of pledge required follows:

The undersigned hereby pledges itself (1) to use only in the manufacture of motor trucks or repair parts for motor trucks the steel suitable therefor, which is now in its possession or which may hereafter come into its possession; (2) to sell no motor trucks of its manufacture except (a) for essential uses, as that term has been or may be defined or applied by the Priorities Division of the War Industries Board, or (b) under permits, in writing, signed by or under authority of such priorities division; (3) to sell no user an unnecessary number of motor trucks even for essential uses; (4) to discourage the purchase of any motor truck to replace a usable truck already in service and to give maximum encouragement to the repair of trucks; (5) that this pledge shall bind not only the undersigned but also its branch houses, subsidiaries, dealers, brokers, factors, commission merchants and all other selling agencies; (6) to make no delivery of any motor truck to anyone for resale, either directly or indirectly, until such one has filed

with the undersigned its pledge of cooperation in writing; and to make monthly reports as required by the War Industries Board to the automotive products section of said board or otherwise as said board may direct.

In addition to making this pledge the manufacturer must require a similar pledge from anyone to whom he delivers a motor truck for resale.

It is ruled that each manufacturer must forward to the Automotive Products Section of the War Industries Board during the first 15 days of each month, a statement showing the number of trucks manufactured during the preceding month, the number delivered to the U. S. Government and its allies, the number delivered for essential uses, giving details, the number of finished motor trucks on hand, the approximate stock of steel on hand and such other information as may be required.

The creation of new plants or the expansion of existing plants for the manufacture of motor trucks is held to be unnecessary and undesirable, inasmuch as existing facilities are ample to produce all the trucks required for essential uses or for which steel can be furnished.

Roads to Carry 10 to 20-Ton Loads

The Construction of Stronger Roads and the Necessity for Maintenance Urged by State Highway Commissioner O'Neil of Pennsylvania

J. Denny O'Neil, State Highway Commissioner of Pennsylvania, was one of the principal speakers at a recent meeting of the Pennsylvania State Association of County Commissioners held at Pittsburgh. Commissioner O'Neil, whose topic was "State Highways," said in part:

"Some idea of the magnitude of the State Highway Department can be formed when I tell you that at the present time we have on our payroll in all departments 8,385 men, and that, notwithstanding the abnormal conditions, the high cost of material and the scarcity of men, we now have under construction throughout the state new road work amounting to over \$5,400,000, and that during the present year we have maintenance work under way to the amount of \$4,000,000, making a grand total of over \$9,400,000.

"The problem of the maintenance of roads is becoming very difficult on account of the automobiles and motor truck traffic, and in the future the roads should be constructed with a view of carrying from 10 to 20-ton loads. Transportation by motor trucks is just in its infancy. I believe it will continue to grow even after the war, as it has been demonstrated that for short hauls truck transportation is not only quicker, but cheaper than rail transportation.

"Last fall when the Government laid out their route for Government trucks they requested us to take care of 12 miles of earth road in Beaver County, and to endeavor to keep that section, as well as the entire Lincoln Highway, open from the Ohio line to the seaboard. When we undertook this work we had no idea of the great difficulties which would confront us. The winter of 1917 was one of the most severe ever known, and it was only by superhuman efforts on the part of our maintenance force that we succeeded. For the first time in the history of the state we kept the road open the entire winter with the exception of one or two days when the wind was so high that the snow would drift back as fast as the roads were opened.

"There are over 90,000 mi. of road in Pennsylvania and for many years to come the larger part of the roads must be maintained as earth roads. The State Highway Department has charge of approximately 8,000 mi. of earth roads and we are paying particular attention to drainage, etc., and as a rule we are able to keep these earth roads in condition at least nine months during the year. The state now has 2,200 mi. of improved roads of various types and 200 mi. additional now under construction."

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

August 17, 1918

THE ILLINOIS BOND ISSUE

Governor Lowden of Illinois believes that the people of that state should ratify the proposed \$60,000,000 road bond issue at the election next fall and he gave some very convincing reasons for that belief in a recent address. His speech, made at a meeting called by the Chicago Automobile Trade Association, is reported, in part, on another page.

Everyone familiar with the devious ways of the average road measure through a state legislature will appreciate the reference to the mutilation of such bills. It is seldom that a law is enacted without so amending the original measure as to greatly decrease the value of its basic provisions. In too many instances, even the drafting of the original measure is governed by politics rather than economics. These facts constitute entirely adequate reasons for favorable action upon a bill drawn to embody a plan worked out by engineers and enacted with few changes. The Illinois bond issue bill was described as such a measure by Governor Lowden.

Another point made was that of the necessity for preparing now for the period after the war. It is realized that the country's present task is the winning of the war and that the accomplishment of the things that contribute directly to that end must be given precedence. At the same time there is danger of leaving too much "until after the war." Any complete, well balanced plan for winning the war must include some provision for after the war conditions. It is never well to become so engrossed in the present as to forget the future.

What the economic and social conditions will be in the period following the war is more or less a matter of conjecture. But one thing is very sure; we shall need roads. There is a great deal of highway work that must be done now, but there can be spared from the doing enough time to prepare for the future.

AN OBJECT LESSON IN ROAD MAINTENANCE

In its consistent advocacy of keeping the roads in repair, "Good Roads" has had the hearty cooperation of road builders and others conversant with the highway situation and the economic and social needs of the country.

We have urged repeatedly that everything possible be done to keep the nation's highway system in the most efficient state possible and have pointed out that if this is not done a gigantic burden will be forced upon the taxpayers after the war to restore the roads and streets ruined by the constantly increasing traffic they have to carry. The truth of this assertion is demonstrated by the conditions in Scotland, described elsewhere in this issue.

In that country, it is said, the roads have been neglected since the outbreak of the war. As in the United States, there has been a large increase in the weight and the number of vehicles using the roads. The neglect of maintenance and the greater burden of traffic have resulted in road conditions that "will necessitate large expenditures for reconstruction of surfaces and for repairing and building bridges, culverts, etc." In fact, this work will be "only second in importance to the more adequate and comfortable housing of the people."

Scotland has been in the war for four years, and, it seems, has neglected her highways almost from the first. America has been in the war nearly a year and a half, and to date the states, the counties, the towns and the road districts have worked hard to maintain their roads. It is evident that they must continue to do so or else face conditions similar to those that exist in Scotland.

The adage that "a stitch in time saves nine" is nowhere more apt than in its application to road maintenance. A comparatively small sum will take care of continuous, systematic upkeep through a considerable period. The same sum spent at the end of a like period in an attempt to reconstruct a neglected road will not go far.

Maintenance should be—and usually is—paid for out of current revenues. Maintenance work, therefore, need not conflict with the Government's borrowings for war purposes. In most localities there is no lack of funds that can be used for maintaining roads, but there is a shortage of labor of the kind that has generally been employed. This can be overcome in a measure by the utilization of other labor and by the employment of machinery.

And the avoidance of an enormous expenditure for reconstruction after the war is not the only reason—nor the most urgent reason—for uninterrupted maintenance during the war. A motor truck manufacturer has pointed out in a recent advertisement that "The road to Berlin begins in America." Few clearer, more concise statements of the situation have been made. Every American-made shell hurled across no man's land, every ration carried from the fields and plains of America, every item of supplies sent overseas to the soldiers of the United States and the Allies, passes over American roads in trucks and in wagons. The country road from the American farm to the railroad, the interstate routes traveled by the army transport trains are links in the lines of communication upon which the modern army is dependent. If they are allowed to go to ruin what will happen?

The Road Situation in Scotland

Enormous Expenditures for Reconstruction Necessitated by Neglect of Maintenance

The reconstruction and repair of roads in Scotland will necessitate large expenditures after the war, according to Rufus Fleming, Consul at Edinburgh, in a recent issue of the "Commerce Reports."

Since 1914, according to Consul Fleming, the roads of Scotland have been neglected, and as a result the main and secondary roads, which have carried a heavier traffic than ever before, are in bad condition. Their reconstruction after the war will be secondary in importance only to the more adequate and comfortable housing of the people, it is stated.

This work will create a strong demand for road making machinery and tools, according to Consul Fleming, and American manufacturers will have an opportunity to supply the demand. The authorities having charge of the work are the county councils and the street departments of cities and large towns, the work seldom being done by contract.

New Jersey Work in 1919

Program for State Highway Construction Next Year Adopted by State Highway Commission

In the work done on the New Jersey state highway system next year, the policy of giving precedence to roads used for military purposes and for transportation incident to the carrying on of the war has been adopted.

At a meeting at Trenton early this month, State Highway Commissioner Thompson submitted a report embodying recommendations as to the roads to be improved in 1919. They are, briefly, as follows: Robbinsville to the Mercer County line, above Hightstown in Route 1; Florence Road to Bordentown in Route 2; Da Costa to Egg Harbor in Route 3; Amboy Bridge to Broadway, South Amboy and Stevens Point to the brick pavement leading to Morgan in Route 4; Mullica Hill to Woodstown in Route 6; from a point near Mountain View toward Butler in Route 8; the straightening of North Avenue, Westfield, in Route 9; from Anderson Avenue westerly to Grand Avenue, Ridgefield, in Route 10; and from Sally Marshall's crossing to Cape May Court House in Route 14.

President Indorses Work of State Defense Councils

Tribute Paid to Local Organizations in Letter to Secretary of War

In reply to a letter from Secretary of War Baker, reporting on the activities of the state councils of defense, President Wilson recently wrote the secretary commending the work that has been done.

President Wilson wrote that he was "particularly struck by the value of extending our defense organization into the smallest communities and by the truly democratic character of a national system so organized." He expressed himself as of the opinion that in the interest of economy and efficiency such machinery as that provided by the state council system for the execution of many kinds of war work should be utilized by the Federal Government so far as possible. In line with this, he suggested that Secretary Baker communicate to the heads of the various government departments and administrations his wish that when considering the extension of their organizations into states they determine whether or not they can utilize the state council system and avoid the creation of new machinery.

In Secretary Baker's letter, he pointed out the various activities undertaken by the state councils, and in reference to their road work said:

"They act also as the state representatives of the Highways Transport Committee of the Council of National Defense in the increasingly important work of extending and facilitating motor truck transportation, in order to reduce the tremendous burden on our railroads and to stimulate the production of food by providing means of transporting it to market."

Railway Area Paving in the City of Baltimore, Maryland

Agreement Reached as to Division of Cost Between City and Railway Company

A controversy of several years' standing, between the City of Baltimore and the United Railways Co., relative to the cost of paving within the railway area, has been settled. Under the form of agreement, the cost of work is to be divided as follows:

"The city will excavate to the base of the concrete for paving and remove all the material which belongs to it.

"The company excavates from the bottom of the base to the bottom of the space to be occupied by the ballast and removes the material, all of which belongs to it.

"In filling in the excavation the company supplies its own ballast under the ties and an inch around them. The city fills in the base for the paving and does the actual paving.

"When the company asks for a paving material of greater cost than the material used by the city in paving the other parts of the street, the company will pay the difference in cost."

Governor Lowden Urges Ratification of Illinois Bond Issue

Proposal to Issue \$60,000,000 in Road Bonds Described as Most Favorable Opportunity to be Hoped for in This Generation

A strong indorsement of the proposed \$60,000,000 bond issue for Illinois road work was made by Governor Lowden of that state in a recent address at a meeting called by the Chicago Automobile Trade Association. Governor Lowden said in part:

"If we don't vote this bond issue this year it will be at least 15 or 20 years, as far as we can tell, before the people of the state will have another chance to authorize a systematic plan of improving our highways.

"Legislators are but human, like the rest of us. Most of you know that when a waterways measure or a good roads measure goes through the hands of the general assembly, it usually comes out ill balanced and badly framed. Most of our good roads bills have been so mutilated—so weighed down with roads which no one travels, but which go by the doors of some legislators' constituents—that you wouldn't recognize them as the original bills.

"But in this case, fortunately, a comprehensive system worked out by highway engineers went through with hardly any change, so that now the people have submitted to them the best plan of highway improvement ever submitted in any state.

"People will tell you this is no time to burden ourselves with bond issues. You know that every cent of these bonds, with the interest, will be paid out of the automobile license fees, but the average man in the state doesn't. It is your business to tell him that not one cent will be added to his taxes.

"True, we are not undertaking much road building during the period of the war, and we are not going to undertake it under this bond issue. But now is the time to prepare for the period after the war. Our men will be returning and public improvements must be provided against their return."

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Crusher Run

Lieut. Ernest Dedicke, who was formerly with the New York State Highway Department, has been severely wounded in France, according to word received by his brother, Lieut. Alfred E. Dedicke.

State Commissioner of Highways Edwin Duffey, has been made a member of the State Highways Transport Committee. The object of the organization is to foster the establishing of rural motor express lines and return load bureaus. The authorities at Washington approve of this organization as an agency to aid and develop transportation.

The New York State Highway Department has kept its promise nobly so far this year in the matter of the oiling of roads. Observation has shown that better work has been done along these lines this year than last. The Highway Department has also done wonderfully good work in restoring the broken surface of the highways between Buffalo and New York, and wherever it became necessary to rebuild it has been done with little or no impeding of travel.

High estimates for the month of July which were reported at the New York State Highway Department: Richard Hopkins, repair contract No. 1,105, Erie County, \$12,610.17 and \$8,989.74; Greenfield Construction Co., repair contract No. 1,159, Ontario County, \$5,926.58 and \$5,889.24; S. B. Van Wagenen, road No. 1,100, Hamilton County, \$7,835.13; Jos. Walker Construction Co., repair contract No. 1,164, Monroe and Ontario Counties, \$5,845 and \$5,667.30; Nathan E. Young, repair contract No. 1,093, Broome County, \$5,062. Antonio Colorusso, John B. Dower and Arthur F. McConville have also been on their jobs, according to the reports.

J. H. Sturdevant of the New York State Highway Department is the division engineer in charge of the most difficult problem this side of the Atlantic. This work is in the completion of the Storm King Highway, north of West Point, on the west bank of the Hudson River about 60 mi. from New York City.

Bids were received Dec. 10, 1914, by the New York State Highway Department for the building of 1.27 mi. of the first link of road across the face of Storm King Mountain. The road is being constructed at the sole expense of the state. When the road has been blasted through, crusher machinery will be erected far up the side of the mountain

and the surplus rock will be crushed and used to fill in and top dress the highway.

No work is being done at present on Crow's Nest. Engineer Sturdevant reports that this construction will be attended to when the Storm King blasting is finished.

Dana W. Robins, one of our live-wire state road contractors, stopped over in Albany on his way from Utica to New York, the early part of this month. He visited the New York State Highway Department and graced the rooms of the New York State Road Builders' Association with his genial presence.

John V. Harrington, of the New York State Highway Department, a member of the Board of Governors of the State Department Bowling League, has now turned his "athletic" attention to baseball. He is on the team of the Dreadnaughts, who recently played an exceedingly good game with the Submarines at Altamont, defeating the latter, 28 to 24.

Never before in history have American highways played such an important part in transportation. We are facing another winter in this world war with more munition factories, more aeroplane plants and over one million men in France who must have food supplies. State highways and trucks must come to the rescue. In some states the highway commissions have no funds to keep the main traveled highways opened and cleared of snow. The States of New York, Pennsylvania, Michigan and Connecticut saw the importance of winter highway traffic last year and passed special legislation to take care of the wartime emergency. These states are foremost this year in planning for the coming winter. New York has appropriated \$1,000,000 for emergency highway work, such as highway and bridge repair and maintenance, and the appropriation provides for snow removal on all roads of military importance.

Supplies from the Quartermaster Corps are on the way to be stored in the completed units of the Government warehouses which are being built by the Feeny & Sheehan Construction Co. at South Schenectady. Major McKerrcher will superintend the storing of the materials in the buildings. Information has reached Schenectady that two more ware-

(Concluded on page 64)



New Hampshire Good Roads Association

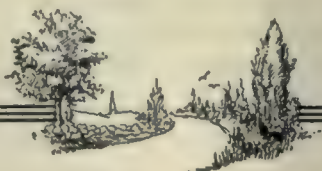


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The following amendments to the constitution and by-laws of the New Hampshire Good Roads Association were adopted at the last meeting of the organization:

Amendment to Article 5, relating to election of officers:
Article 5, to be amended by striking out the word "three" in the fifth line, so that it shall read as follows:

Officers shall be elected as follows: At the regular meeting in December the association shall choose a nominating committee of five who shall submit to the secretary within three weeks the names of candidates for each office to be balloted for. Letter ballot shall be then sent by the secretary to each member of the association at least 30 days before the day of the annual meeting, stating the hour at which the polls will close on that day. Each ballot shall be returned to the secretary enclosed in two envelopes, the inner one to be blank and the outer one to be endorsed with the member's signature. The president shall appoint two tellers who shall canvass all ballots and the result shall be announced at the annual meeting.

Of the candidates for any office the one having the largest number of legal votes by letter ballot shall be elected. Should there be a failure to elect any officer on account of a tie, the meeting shall proceed to ballot for such office, the choice of candidates being limited to the persons so tied. Vacancies occurring in any office may be filled by ballot at the first meeting after notice of the same has been sent to each member, a majority of the votes cast being necessary to elect.

Amendment to Section 8.

Amend section 8 by striking out the first paragraph and substituting instead thereof the following:

Fees and dues: The initiation fee for membership in the association shall be \$2, which fee shall include the annual dues for the remainder of the fiscal year.

Amendment to Article III.

Amend Article III of the constitution relating to "officers" by striking out the last "a" in the second line and inserting instead thereof the word "and" so that, as amended, it shall read as follows:

ARTICLE III. Officers.

The officers of this association shall consist of a president, two vice presidents, a secretary and treasurer, and four directors.

Amendment to Article 10, relating to forfeiture of membership:

Article 10 to be amended by striking out the first sentence and inserting instead thereof the following:

Membership shall automatically cease when the member becomes more than two years in arrears in the payment of his dues, said member having been properly notified by the secretary, and the name of the said member shall, under those conditions, be dropped from the roster,

so that it shall read as follows:

Forfeiture of membership: The board of Government may,

however, at its discretion, reinstate such person on the payment of all arrears. Membership shall automatically cease when the member becomes more than two years in arrears in the payment of his dues, said member having been properly notified by the secretary and the name of the said member shall, under those conditions, be dropped from the roster.

By special invitation, Messrs. Brown & Clark of Concord, Mayor Crowley of Nashua, French of Laconia, and Neil of Meredith, attended the August meeting and Ladies' Day outing of the Massachusetts Highway Association on Aug. 8. The association members and their friends were guests of the City of Boston on a boat excursion around Boston Harbor and an account of this trip will be found on another page under the Massachusetts Highway Association notes.

Throughout New Hampshire all road work is progressing very slowly on account of the scarcity of labor.

Two miles of roadway between Laconia and Meredith are now under construction and about 1¼ mi. have been completed.

The quarterly meeting of the association will be held in Lebanon, N. H., on Sept. 12 and it is hoped that there will be a large attendance.

Nashua has arranged to invade Lebanon in force and the party will be under command of Mayor Crowley who will be ably assisted by Lieutenants Winslow and Winn. Reinforcements are expected from Dover and Portsmouth and we believe that unless these and other town are represented on the firing line, a draft order will have to be issued and M. P.'s sent out to round up the delinquents.

Slackers are unpopular and in the next issue there will be printed a full list of the members that attend the meetings, so be sure and be on the job.

The Dover Point Bridge which was destroyed by the ice floe last March has been repaired and is now open for traffic over the highway section. The reopening of the bridge was a great convenience to the citizens of this section and is of great economic value to Dover, inasmuch as the hundreds of workmen employed at the Newington shipyards just across the bridge, can now reach their homes in Dover without going around by way of Rockingham. The 6 mi. of highway between Dover and the bridge will soon be placed in shape by Divisional Engineer Grover, arrangements having been already made to oil a stretch of the road.



Massachusetts Highway Association

Founded 1893

OFFICERS FOR 1917-18

President, JOHN M. KEYES, of Concord

Secretary
JOHN M. MCCARTHY
15 Ashburton Place
Boston

Treasurer
CHARLES A. BROWN
Wellesley

Vice-Presidents
ALBERT H. RHODES, Worcester
WILLIAM J. GANNON, Fitchburg

Directors
CHARLES J. BENNETT, Hartford, Conn.
RICHARD A. JONES, Waltham
HENRY A. SPATES, Winchester
JOHN A. GAFFEY, Medford

Announcement

This section of the paper is open to members of the Massachusetts Highway Association for the discussion of matters directly connected with road interests. Members are requested to submit items of interest for use in this column.

Address all communications to GOOD ROADS, P. O. Box 2613, Boston.

The quarterly meeting of the Massachusetts Highway Association was held on August 6, and consisted of a trip around Boston Harbor on the city's steamer the Monitor. The boat left the dock at 10 a. m., and returned about 4 p. m. The weather was fine, and 192 members and guests were present.

It should have been called "Jere Watson Day," for it was at the suggestion of Councillor James A. Watson that the outing was arranged and was made possible through Jere's friendship with Mayor Peters, who kindly donated, as from the City of Boston, the lunch and the use of the boat for the day.

There is some class to Jere as a wonder worker at the City Hall.

After viewing many nearby points of interest a stop was made at Bumkin Island, where there is a large training camp for naval reserves. The party was met by Capt. Camden, who is in command of the island, and the members were given an opportunity to inspect the camp.

After leaving Bumkin Island other points of interest were visited, and the trip was enjoyed by all.

Among the distinguished guests and members present were Mayor Quinn, of Cambridge; Mayor Ashley, of New Bedford; Mayor Crowley, of Nashua, N. H., and Mayor Holmes, of Worcester.

As the August trip each year is designated as Ladies' Day there were present a considerable number of wives and daughters of the members.

News and Gossip

We have heard of one Massachusetts highway contractor who is paying laborers 45 ct. an hour for a 9-hour day, and on a road in Rhode Island another contractor is paying \$5 per 9-hour day for workmen.

Chairman James B. Shea, of the Boston Park and Recreation Commission, has informed the City Council that unless drastic action is taken the Boston Common will, within a few years, be treeless. Prof. Sargent, one of the leading forestry experts of the country, has indicated about

800 old and decrepit trees that should be removed at once to make room for young trees to be planted.

"The Young Lady Across the Way" in the Boston Post says there was a time when salesmen thought they had to drink and carouse with their customers, but everything is on a strictly business basis now, and gross sales are practically unknown.

Attleboro has adopted a new method in paying town laborers. Instead of raising the rate of the daily wage it remains at \$2.75, but for the period of the war a bonus of \$1.50 will be added to the weekly pay of each man who has worked full time.

The Brookline assessors have announced that the tax rate will be \$15.30 per thousand, which is a reduction of 40 ct. from last year's rate. The total valuation of the town is about \$93,000,000. Economy in making appropriations for this year is responsible for the reduction in the rate.

The following is reprinted from the New England Motorist, the official organ of the A. L. A.:

Exhausted Patience

The Massachusetts law passed some two years ago intended to prohibit the spreading of tar, oil or other slippery substance upon the highways without covering it over with sand, dirt or gravel within 24 hours thereafter unfortunately contains a provision permitting such slippery substance to be left uncovered if there is a good detour or another road available, which provision modifies the law very substantially.

There still remains, however, the original provision that where there is no good road or detour available, and more than one-half of the roadway is covered with tar or other slippery substance, it must be covered with sand, dirt or gravel within 24 hours thereafter.

Many of the cities and towns of Massachusetts seem to have regarded this law as a dead letter, probably due to the negligence of automobilists in not making complaints in the criminal courts against those who violate it.

The patience of automobilists, however, is about becoming exhausted, and there is a strong feeling on the part of many that whenever this law is violated someone should be made to suffer for it, and we believe in the very near future no further violations of this law will be permitted.

Only recently a road in the town of Holliston leading into the town of Sherburne was completely covered with slippery substance in the nature of tar, and left uncovered for

more than three days, and, in consequence, automobiles were damaged to the extent of several thousand dollars.

We sincerely hope that automobilists will see to it that this law is enforced in the future, and that they will not hesitate to go to the slight trouble of ascertaining who the guilty parties are and then ask the court having jurisdiction over the district in which the offence was committed to issue a summons calling the guilty party into court.

A few prosecutions of this nature would have a desirable effect.

The Essex County commissioners have awarded the contract to build the detour highway around Floating Bridge Pond, Lynn, between Western and Eastern Aves., to the M. McDonough Co., of Swampscott, for \$22,480, the work to be completed in 50 days. This road, though built as a temporary highway until such time as the old Floating Bridge can be replaced with a modern structure at a price which is not prohibitive, will probably remain as a permanent street.

The Floating Bridge was about a year ago deemed unsafe for heavy traffic, and legislative permission was secured to build a modern bridge. When bids were asked the costs were judged prohibitive, and permission was secured to build a temporary detour.

Maine is trying the experiment of using prison labor on highway building. So far the test is declared a success. Twenty-five men are sent each day from the prison 14 mi. to the Camden state road, where they labor all day, returning to the prison at night.

Superintendent Crafts, in charge of the work, informs Warden Ham it would be impossible to get 25 men who would do better work.

They leave the prison here at 6 a. m. in auto trucks, reaching the work by 7 o'clock. They are back at the prison by 5:45 p. m.

Warden Ham says while it would be possible, by establishing camps, to use the men at greater distances in this work he does not regard it as practicable. It would necessitate working more men, making it impossible to operate the manufacturing departments of the prison. As the men could not build roads in winter they would have to loaf, because the markets for goods would be lost.

A committee headed by George W. Bloodgood, President of the Lynn City Employees, has arranged for the reception of state and city employees at the 13th annual convention to be held in Moose Hall, Lynn, Aug. 17, 18 and 19. Important matters will be discussed and several resolutions are already in the framing to be presented to the delegates.

New regulations governing the use of lights on motor vehicles have been prepared by the Massachusetts Highway Commission and have been approved by the Executive Council, and now have the force of law.

The principal change is a requirement that every motor vehicle, when in motion, shall use lights sufficient to disclose the presence in the highway of "any substantial object" within a distance of 150 ft. The prohibition against dazzling lights is also newly worded in an effort to make it more easy of enforcement. The new regulation reads as follows:

Wherever there is not sufficient light within the limits of the highway location to make all vehicles, persons, or substantial objects clearly visible within said limits for a distance of at least 150 ft., the white lights, or lights of yellow or amber tint, which a motor vehicle is required to display by section 7 of chapter 534 of the Acts of 1909, as amended, shall, when said vehicle is in motion, throw sufficient light ahead to show any person, vehicle, or substantial object upon the roadway straight

ahead of the motor vehicle for a distance of at least 150 ft. Any light thrown directly ahead or sidewise shall be so arranged that no dazzling rays from it or from any reflector shall be at any time more than 3½ ft. above the ground on a level road at a distance of 50 ft. or more ahead of said vehicle, and said light shall be sufficient to enable the operator of the motor vehicle to see any person, vehicle or substantial object upon the roadway or side thereof, for 10 ft. on each side of the motor vehicle 10 ft. ahead of said vehicle.

The resignation of Superintendent of Streets Devir may be expected at any moment. Mr. Devir has successfully passed both the physical and mental examinations for a commission in the Quartermaster's Corps for immediate overseas service, and has been commissioned second lieutenant.

Superintendent Devir has been willing to enter the service for some time, but until lately the War Department has refused any but college men. Now, however, it has awakened to the fact that practical men like Mr. Devir are much more available. It is understood that he stood very high in his examinations.

The position of Superintendent of Streets pays \$2,300 a year, and is one of the best in the city. Superintendent John A. Carter of the Water Work Division, who resides at 48 Fairmount Street, is being considered for the place by the Street Commission. Mr. Carter has been in the city's employ for many years and now draws \$4.25 a day.

The mayor is in favor of succeeding Superintendent Devir by some man trained by the State Highway Commission or Metropolitan Park Commission.

The special commission appointed by the Legislature to study the automobile situation from every point of view has been formally organized and one meeting was held this week. Col. W. D. Sohier, by virtue of his position of chairman of the Massachusetts Highway Commission, is chairman of this body and Paul Howard is secretary.

By the time the next meeting is held, which will probably not be for five or six weeks, the new commission should be in possession of a fund of valuable data, for Secretary Howard has been instructed to secure information from other states, especially with regard to the laws safeguarding the interests of the public in view of the increasing number of accidents. When this budget of information has been turned over to the commission, a public hearing will be announced.

Crusher Run

(Concluded from page 61)

houses and two huge open sheds have been decided upon by the Federal Government, in addition to those already contracted for and under construction. With these four additions it is estimated that the depot when completed will cost between \$7,000,000 and \$8,000,000. The new buildings just authorized will be 1,680 ft. long, 160 ft. wide and 16 ft. high. The two sheds will be 1,500 ft. by 160 ft., and 16 ft. high. The extension of the depot means, of course, an extension of the railroad tracks in and about the plant. The general manager for this gigantic construction is John H. Gordon, who is president of the New York State Road Builders' Association and also one of the directors of the United States Good Roads Association.

S. B. Van Wagenen of Rondout, N. Y., and Joseph Walker of the Walker Construction Co., of Albany, N. Y., were low bidders at the letting by the New York State Highway Department on Aug. 12.

M E E T I N G S

Calendar of Coming Meetings

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Oct. 7-9.—American Association of State Highway Officials.—Annual meeting Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Nov. 14-15.—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Pennsylvania State Association of County Commissioners

The thirty-second annual convention of the Pennsylvania State Association of County Commissioners was held at Pittsburgh, Pa., last week.

J. Denny O'Neil, State Highway Commissioner of Pennsylvania, and Charles A. Synder, State Auditor General, were the chief speakers at the closing session. Part of Commissioner O'Neil's address is printed on other pages of this issue.

North Carolina Good Roads Association

The annual convention of the North Carolina Good Roads Association was held at Harbor Island Auditorium, Wrightsville Beach, Wilmington, N. C., on Wednesday, Thursday, and Friday of last week.

With the exception of the omission of several of the scheduled addresses because of the absence of speakers the program was carried out substantially as printed in "Good Roads" for July 27. During the meeting the delegates were taken on a trip of New Hanover County roads, and were entertained at a smoker.

Officers for the coming year were elected as follows:

President, W. A. McGirt, Wilmington; First Vice President, Col. Benehan Cameron, Durham; Second Vice President, A. M. McDonald, Charlotte; Secretary, Dr. Joseph Hyde Pratt; Assistant Secretary, Miss H. M. Berry, Chapel Hill; Engineer in Charge of Publicity, John D. Waldrop. District vice presidents elected were as follows: J. L. Warren, Washington; W. F. Woodward, Wilson; George E. Butler, Clinton; Joseph G. Brown, Raleigh; W. C. Boone, Pomona; W. D. MacMillan, Jr., Wilmington; W. S. Blakeney, Monroe; W. W. Stringfellow, Blowing Rock; H. K. Davenport, Gastonia; J. D. Murphy, Asheville.

Among the resolutions adopted by the convention were the following:

This convention receives with approval the gratifying information of the great meeting in the interest of the Eastern Highway on the 30th day of July, 1918, in Washington, D. C. The project is both feasible and practicable.

RESOLVED: That we approve the location of the contemplated highway beginning at Wilmington, N. C., and crossing the Roanoke River and ending at the world's greatest naval base at Norfolk, Va.

RESOLVED: That we recommend that the various highway commissions—national, state and county—contribute to the building and erection of the said highway and necessary bridges, and we endorse the action of the North Carolina State Highway Commission in making liberal appropriation to said enterprise.

WHEREAS, By reasons of the development of the automobile as a practical mode of travel, affording opportunity to

every citizen to visit not only the centers of population, but the most remote corners; and

WHEREAS, For the citizens of the state to obtain the maximum of benefits to be derived from the automobile a state system of highways is a necessity, and in the march of progress must be constructed and maintained; and

WHEREAS, The greater wealth of the country is now and ever will be to some extent segregated in the more populous centers, which must in the future as in the past, rely upon the rural sections for development, such rural sections in many instances embracing entire counties; and

WHEREAS, Many of the rural counties in the state have not the power of organization, and if organized have not the means with which to construct and maintain the highways within such counties forming the state system; and

WHEREAS, It being to the best interest of all of the people of the state to merge the interests of all of the various communities, so far as is necessary to the creation and maintenance of the state highway system, and that such system be treated as a state institution; and

WHEREAS, A small tax levied annually on all property in the state and expended by the State Highway Department in the construction of the state highway system, would in a comparatively short period of time develop a satisfactory system of highways as aforesaid, which highways can be maintained by the highway department with the funds derived from the tax on automobiles as now provided, or as shall hereafter be provided by law; and

WHEREAS, The employment of all persons convicted of crimes and sentenced to the penal institutions of the state at hard labor can be employed in the construction of a state system of highways to the greater and more uniform advantage of the citizens of the state than in any other manner, all to the lasting good of the commonwealth;

THEREFORE, BE IT RESOLVED, By the North Carolina Good Roads Association in convention assembled at Wrightsville Beach on Aug. 7, 8 and 9, 1918, that the General Assembly of North Carolina be and it is hereby memorialized to enact at the next session thereof such statutes as shall be requisite to the adoption of a plan for the state highway system as outlined in the preamble of this resolution;

RESOLVED FURTHER: That the legislative committee of this association do prepare such bills as shall be regarded necessary to that end and present the same, together with this memorial petition, to the said General Assembly at its next session, and to do all other things which such committee shall deem in the interest of a state highway system.

Owing to the weakness of divided efforts and the useless expenditures of private funds involved in the support of the various state-wide organizations, such as the North Carolina Good Roads Association and the Association of County Commissioners and the various special highway and kindred associations; be it

RESOLVED: That a committee be appointed by the association to confer with the other above mentioned associations to formulate a plan whereby one convention may be held each year where all these interests may be represented and a strong team for road as well as civic betterment may be hooked up that will pull with effect and accomplish results.

PUBLICATIONS

CINCINNATI, OHIO, DEPARTMENT OF STREET, SEWER AND CATCH BASIN CLEANING. Annual report for the year of 1917. Paper, 6x9 in., 34 pages and covers.

This report contains a general statement covering the work of the department, followed by a large number of tables showing the details of the work done. Much of the tabular matter relates to unit costs.

KENTUCKY DEPARTMENT OF PUBLIC ROADS. Proposal Contract and Bond Forms and Specifications. Paper 8¼x10¼ in., 61 pp. and covers.

Most of the contents of this publication consist of the standard specifications of the Kentucky Department of Public Roads for various kinds of pavement. There are also included forms for contracts, proposals, bonds and notices

of various kinds. The specifications include several pages of general provisions, together with detailed specifications for excavation and embankment, base courses of stone, slag, gravel and concrete, surface courses of gravel, water-bound macadam, bituminous macadam, bituminous concrete, rock asphalt, cement concrete and vitrified brick, concrete, reinforcement, masonry, pipe culverts, curbs, etc.

"HIGHWAY TRANSPORTATION." Official Bulletin of the Motor Truck Club of America. Vol. VIII, No. 1, July, 1918. Paper 9x12 in., 28 pp., including covers; illustrated.

This monthly publication takes the place of the "Bulletin" formerly printed by the club, and besides being of different size, includes a larger amount of matter of general interest. This first issue contains, among other articles a paper on "The Construction and Maintenance of Highways Under War Conditions," by Arthur H. Blanchard, an account of the meeting of representatives of return load bureaus of New York, Pennsylvania, New Jersey, Connecticut and Massachusetts held recently at the assembly rooms of the Mer-

chants' Association of New York, and an account of tests of the distances required to stop motor vehicles of various types. The publication is printed on paper of excellent quality and is well illustrated.

LINCOLN HIGHWAY OFFICIAL ROAD GUIDE. Leather, 5½x9 in., 288 pp. and covers; inset map. Published by the Lincoln Highway Association, Detroit, Mich. \$1.50.

Besides embodying the usual information contained in an automobile guide book, this guide carries a large amount of other matter, some describing the Lincoln Highway and the Lincoln Highway Association, and the rest covering topics of interest to the tourist. Among the features are included directions for tourists; schedules of equipment required; an estimate of the cost of the trip; digests of state regulations governing licenses, speed, and lights, descriptions of roads connecting with the Lincoln Highway, and other matter. There are many ruled blank pages in the book for memoranda, and a map of the Lincoln Highway and other through roads is included as an inset. The book is bound with flexible leather covers embossed in gilt.

PERSONAL MENTION

J. H. Moore has resigned as City Manager of Sault Ste. Marie, Mich.

J. Charlton has been appointed City Engineer of Brunswick, Ga., succeeding J. B. High.

Charles H. Blitman has resigned as City Manager of Glasgow, Mont., to join the Aviation Corps of the Army.

Edgar M. Hoopes, Jr., Chief Engineer of the City Engineering and Water Departments of Wilmington, Del., has resigned to enter Government service.

O. E. Carr has resigned as City Manager of Niagara Falls, N. Y., to become City Manager of Springfield, O., succeeding Charles D. Ashburner, who became City Manager of Norfolk, Va., some weeks ago.

R. M. Cooksey, Highway Engineer of the City of Baltimore, Md., has resigned and has accepted a commission as major in the Construction Division of the Quartermaster's Department of the Army.

Howard S. Porter, of Hartford, Conn., has been promoted from the rank of captain to that of major in the 201st Engineers. Maj. Porter was formerly Chief Draftsman of the Connecticut State Highway Department.

Charles M. Babcock, State Highway Commissioner of Minnesota, has been appointed Chairman of the State Highway Transport Committee by Governor Burnquist. The appointment was made at the request of officers of the National Highways Transport Committee.

Winton L. Miller has been appointed City Manager of Bethlehem, Pa. Mr. Miller, who is the first incumbent of the office, was formerly secretary to City Manager H. M. Waite, of Dayton, O., and later became City Manager of St. Augustine, Fla. Since early this year he has held a Government position at Hog Island.

John Yeon, a wealthy resident of Portland, Ore., who has served without pay as roadmaster of Multnomah County for a number of years, has retired to become supervisor of spruce activities in Clatsop County. Mr. Yeon will serve the Government in this capacity as a "dollar a year man," and because of his long experience in lumbering will be of great value in the work he is undertaking.

E. H. Jeffries has been appointed City Engineer of Manteca, Cal.

J. Newton Johnston has resigned as City Manager of Ocala, Fla., to become City Engineer of Wilmington, N. C.

Wilder Rich, City Engineer of Sault Ste. Marie, Mich., is acting temporarily as city manager, succeeding J. H. Moore, resigned.

George M. Zimmerman who recently tendered his resignation as City Manager of Sandusky, O., has reconsidered and will remain.

A. E. Hutchison, Municipal Engineer of Albuquerque, N. M., has resigned and has been commissioned a lieutenant in the U. S. Engineer Corps.

John L. Hyde has resigned as Town Engineer of Westfield, Mass., to accept an engineering position with the Emergency Fleet Corporation.

Paul G. Redington has resigned as City Manager of Albuquerque, N. M., and has resumed his duties as District Forester in the U. S. Forestry Reserve.

Charles Henry Rust has resigned as City Engineer of Victoria, B. C., to accept a position with a private corporation in Toronto, Ont. Mr. Rust, who has been City Engineer for the past six years, was at one time City Engineer of Toronto. He served as president of the Canadian Society of Civil Engineers in 1911 and also served two terms as vice president of that association, of which he was a charter member.

James Wilson, County Engineer of Newcastle County, Delaware, died recently at his home near Wellington. Mr. Wilson, who was 60 years old, had been County Engineer for the past 11 years. He was a graduate of Lafayette College and had spent a number of years in railroad work in South America. After his return from South America he was appointed City Engineer of Wilmington, Del., and then joined the engineering force of the Pennsylvania Railroad. After completing the work on which he was engaged he was again appointed City Engineer of Wilmington and served in that capacity until he resigned to become county engineer.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, AUGUST 24, 1918.

Number
8

State Road Maintenance in 1918

Survey of Country Shows Upkeep of Roads Being Continued Despite Labor and Material Shortages and Transportation Difficulties

With the labor shortage becoming more acute, the obtaining of materials more difficult, and the traffic that many of the improved main highways are being called upon to carry growing heavier and heavier, the matter of maintenance is demanding more and more attention from state highway officials. Believing that this subject is of quite as much general interest as any with which highway engi-

neers have to deal, "Good Roads" has recently undertaken a survey of the country to ascertain how the work in the various states is affected by existing conditions and what steps are being taken by the various state highway departments to overcome these obstacles.

In order to obtain the data there was sent to each state a questionnaire consisting of ten questions, as follows:



Tractor Dragging in Missouri.



Illinois Maintenance Truck.



Maintenance Outfit in Oakland County, Mich.



Heating Kettle and Tool Wagon in Illinois.

MAINTENANCE MACHINERY AND EQUIPMENT IN VARIOUS STATES.

- 1.—What unit (state, county, township, district, etc.) maintains:
 - (a) State highways?
 - (b) State aid highways?
 - (c) County highways?
 - (d) Town highways?
 - (e) Other classes of roads?
- 2.—What official of your department is responsible for its maintenance work?
- 3.—Do your district or division engineers have charge of both construction and maintenance, or have you a separate organization for handling each?
- 4.—Is there scarcity of labor for maintenance work in your state?
- 5.—Have you been able to substitute machinery so as to make up any shortage in labor?
- 6.—Is there a shortage of material for maintenance? If so, please state what.
- 7.—Is shortage of materials due to lack of supply, transportation, or both?
- 8.—Have you curtailed maintenance on any of your highways because of lack of labor or material?
- 9.—Will all of your main highways be put in proper condition to go through the coming winter?
- 10.—What suggestions have you to make relative to correcting adverse conditions?

The replies to questions Nos. 1, 2 and 3 are shown in Table I. It should be noted that in this table dashes in the second, third, fourth and fifth columns indicate that there are no roads in the state of the class indicated. It should also be noted that while many of the answers to question No. 2 indicate that the chief executive officer of the department is responsible for maintenance work, it is probable that in many cases the direct supervision of such work is delegated to some other official, as in Connecticut, Illinois, Michigan, New York, North Carolina, Pennsylvania, Virginia and Wisconsin. The replies to question No. 3 are also of interest in view of the discussions which have arisen from time to time as to the advisability of having both construction and maintenance work under the direction of the same engineer. It will be noted that only three of the states which have replied to the question maintain separate organizations.

In Table II are grouped the replies to questions 4, 5, 6 and 7. The replies are substantially the same as those given on the blanks, this method of presentation having been adopted as more illuminating than any attempt to interpret the replies and present them by groups.

It is worthy of note that there is a scarcity of labor in almost

TABLE I.—ADMINISTRATION OF MAINTENANCE WORK IN DIFFERENT STATES.

Question 1.—What unit (state, county, township, district, etc.) maintains:				Question 2.—What official of your department is responsible for its maintenance work?		Question 3.—Do your district or division engineers have charge of both construction and maintenance, or have you a separate organization for handling each?	
State	State Highways	State Aid Highways	County Highways	Town Highways	(a)	(b)	(c)
Alabama.....	County	County	County	County	State Engineer	.....	Both
Arizona.....	State	State	County	.....	State Highway Commissioner	.....	Both
California.....	State	State and County	County	Town	State Highway Commissioner	.....	Both
Colorado.....	State	State	County	Town	Superintendent of Repairs	.....	Separate
Connecticut.....	.....	.....	.....	.....	Chief Engineer	.....	Both
Delaware.....	State and County	State and County	County	.....	State Road Commissioner	.....	Both
Florida.....	State	State and County (c)	County	Town	State Highway Engineer	.....	Both
Idaho.....	State	State	County	.....	Maintenance Engineer	.....	Both
Illinois.....	State	State and County	County	Town	Road Engineer (d)	.....	Both
Iowa.....	State	State and County	County	County	State Highway Engineer	.....	Both
Kansas.....	State and Town	State and County	County	Town	Commissioner of Public Roads	.....	Both (e)
Kentucky.....	State	State and Town	County	County	Superintendent of Maintenance	.....	Both
Maine.....	State	State	County	Town	Chief Engineer	.....	Both
Maryland.....	State	Town	County	Town	Chief Engineer	.....	Both
Massachusetts.....	County	County and Town	Town	Town	Maintenance Engineer	.....	Both
Michigan.....	County	County and Town	County	Town	First Assistant Road Engineer	.....	Both
Minnesota.....	County and State (b)	County	County and Town (b)	.....	.....	.....	Both
Mississippi.....	County and State (f)	County	County	Town	State Highway Commission	.....	Both
Missouri.....	.....	State and Town	County	County or Town	Division Engineers	.....	Both
Montana.....	State	State and County	County	Town	State Highway Engineer	.....	Both
Nebraska.....	State	State and County	County	.....	State Highway Engineer	.....	Both
Nevada.....	State	State and County	County	County and Town	Second Deputy Commissioner	.....	Both
New Hampshire.....	State	State and County	County	County and Town	Maintenance Engineer	.....	Both
New Jersey.....	State	State and County	County	County	Deputy Commissioner	.....	Both
New Mexico.....	State	State and County	County	County	State Engineer (h)	.....	Both (i)
New York.....	State	State and County	County	County	State Highway Engineer	.....	Both
North Carolina.....	State (g)	State and County	County	County or Borough	Second Deputy Commissioner	.....	Both
North Dakota.....	County	State and County	County	Town	Chief Engineer	.....	Both
Oklahoma.....	County	State and County	County	.....	State Highway Engineer	.....	Both
Oregon.....	State and County	State and County	County	.....	State Highway Commissioner	.....	Both
Pennsylvania.....	State	State and Town	County	.....	State Highway Engineer	.....	Both
Rhode Island.....	State	State and County	County	.....	State Highway Engineer	.....	Both
South Carolina.....	County (a)	State and County	County	.....	State Highway Engineer	.....	Both
South Dakota.....	County	State and County	County	.....	State Highway Engineer	.....	Both
Tennessee.....	County (c)	State and County	County	.....	State Highway Engineer	.....	Both
Texas.....	State and Town	County (c)	County and District	.....	State Highway Commissioner	.....	Both
Vermont.....	County (c)	County	County	.....	First Assistant Commissioner	.....	Both
Virginia.....	County (c)	County	County	.....	State Highway Commissioner	.....	Both
Washington.....	County (c)	County	County	.....	Engineer-Chairman	.....	Both (e)
West Virginia.....	County (c)	County	County	.....	Maintenance Engineer	.....	Both
Wisconsin.....	County (c)	County	County	.....	.....	.....	Both

(a) State Highway Department has no authority. (b) In certain cases road districts have charge of work. (c) Under state supervision. (d) State officials act in advisory capacity only. (e) Done by county officials under state supervision. (f) All state work is cooperative and is done under special arrangements with counties. (g) Unless road has been improved by state or federal aid. (h) Has "nominal control." (i) Have advisory powers only. (j) Or borough. (k) Maintenance organization of department not completed.

TABLE II.—CONDITIONS AS TO LABOR AND MATERIAL SUPPLY.

State.	Question 4—Is there scarcity of labor for maintenance work in your state?	Question 5—Have you been able to substitute machinery so as to make up any shortage in labor?	Question 6—Is there a shortage of material for maintenance? If so, please state what.	Question 7—Is shortage of materials due to lack of supply, transportation, or both?
Alabama	Yes	To some extent	No shortage, but difficult to get transportation.	Transportation
Arizona	No	.....	No; selected local material used.	.....
California	Not yet, but labor will be short during the harvesting season	California has always made all possible use of machinery	Not yet	Materials will be short later on when transportation will be impeded by the movement of the crops
Colorado	Yes	To some degree	No shortage of such as we use.	.....
Connecticut	Yes	Somewhat	No	.....
Delaware	Yes	To a degree	Yes; stone and asphalt	?
Florida	A very great scarcity at present	To a limited extent	Oil and asphalt for surfacing	Both
Idaho	Yes	Yes, to some extent	No; we construct only dirt, gravel and crushed rock surfaced roads	No shortage
Illinois	Yes	Yes, in some cases	No	Transportation
Iowa	Serious shortage	Not enough men to operate all the road machinery available.	Hard to get lumber and steel	Both
Kansas	There is a decided scarcity	In many instances counties are substituting motor trucks and tractors for horses in dragging	Not a very decided shortage of maintenance materials	.....
Kentucky	Yes, but can probably obtain sufficient labor for light work and patrolling	Not to any extent; practical labor saving machinery is hard to find	Asphalt, oil, tar, gravel, sand, stone chips	Lack of transportation and Governmental orders
Maine	We have one patrolman in each town on 10 mi. of road and, in addition, a flying squadron, with trucks, camps, etc., for bituminous and gravel resurfacing. Have been able to keep it going, but there is a scarcity of good men for this work.	Yes; trucks, gravel loader	We ordered our bituminous material early in the season and, therefore, have been able to make all necessary repairs; otherwise we would be handicapped now	U. S. regulations
Maryland	Yes	No	Both stone and bituminous materials are scarce, but obtainable	Both
Massachusetts	Yes	To some extent	Oil and tar; on account of Government regulations	See No. 6
Michigan	In some parts	To some extent	No	.....
Minnesota	No	Yes	No	.....
Mississippi	Yes	Yes	Yes; gravel, on account of car shortage	Transportation
Missouri	Yes	Counties are using tractor power to an increasing extent	Oil, asphalt and tar products	Transportation and Government regulation
Montana	In certain sections, yes; in others, no.	To only a limited extent	No	.....
Nebraska	Yes	Yes	No	.....
Nevada	Yes, but not very pronounced	Yes, especially by use of tractors	No	.....
New Hampshire.....	Labor not scarce, but high in price	.....	Shortage of road oils	Both
New Jersey.....	Yes, and that available is inefficient and costly	To a limited extent	Stone, sand, asphalt and tars	Mostly due to lack of transportation; due in part to unusual Government requirements for building purposes.
New Mexico.....	Shortage at this time.	To only a small degree.	No; we use gravel, stone or earth only	.....
New York.....	Yes	No	Bituminous materials	Both
North Carolina.....	Yes	Largely	Asphalt, cement, stone	Both
North Dakota.....	Yes	No; department not organized sufficiently yet	None	.....
Ohio	Yes	To some extent	Yes; stone, brick and bitumens	Both
Oklahoma	Yes	To a limited extent—all roads are earth roads	No	.....
Oregon	No	To a considerable extent	No	.....
Pennsylvania	In some sections	In the larger operations, yes	In a number of districts crushed stone and chips are difficult to obtain	Mostly lack of supply
Rhode Island.....	Yes, but not particularly serious	Yes	Yes; bitumens	Transportation, apparently
South Carolina.....	.....	To a large extent, particularly on sand-clay and top-soil roads.	No	.....
South Dakota.....	Yes	To some extent	No	.....
Tennessee	Yes	Not entirely	All materials that require train haul	Transportation and labor conditions
Vermont	Yes	Somewhat	In some districts there is a shortage of gravel, due to exhaustion of gravel pits	Supply
Virginia	Yes	Only partially	Shortage of stone and gravel	Both supply and transportation
Washington	There is such scarcity—applied to all lines—but the county administrations are fairly meeting the situation	To some extent	Not to any extent—except in case of oil (asphaltic)	Both—as applied to exception noted
West Virginia.....	Labor is scarce for all purposes	This being a mountainous country we use steam shovels, graders, wheel scrapers, etc., to good advantage	Not much	.....
Wisconsin	No great scarcity	Yes	Yes; light oils	Lack of supply offered

every state, and that in a large majority of the states some progress towards overcoming this shortage has been made by the substitution of machinery for labor. The replies to question No. 6 indicate that officials having charge

TABLE III—EFFECT OF LABOR AND MATERIAL SITUATION ON MAINTENANCE WORK.

State	Question 8.—Have you curtailed maintenance on any of your highways because of lack of labor or material?	Question 9.—Will all of your main highways be put in proper condition to go through the coming winter?
Alabama	Counties have been compelled to	As far as possible
Arizona	No; delay in oiling only, on account of war conditions	No winter weather here
California	No	Yes
Colorado	Yes	We hope so
Connecticut	No	Yes
Delaware	Not as yet	?
Florida	Not yet, but may have to shortly	Yes, so far as possible
Idaho	No	Yes
Illinois	Yes, in a few cases	Yes, 90% of normal
Iowa	Every county has curtailed both maintenance and construction.	In as good condition as possible under circumstances
Kentucky	Law allowing maintenance by this department has been in effect only two months. Formerly counties did the work—if any were done	No
Maine	Not materially	Yes, practically so
Maryland	No	Yes
Massachusetts	Have curtailed reconstruction	Yes
Michigan	Not to an appreciable extent	Yes
Minnesota	On contrary, have increased	As nearly as possible
Mississippi	Yes	No
Missouri	Yes	Probably not
Montana	Curtailment due principally to lack of funds	Problematical
Nebraska	No	Yes
Nevada	Do not believe counties have curtailed.	Will be maintained as usual.
New Hampshire	Curtailed because of lack of materials	Practically so
New Jersey	Yes, in localities where labor is scarce and materials high in cost	Generally speaking, yes
New Mexico	No	Yes
New York	Yes	No
North Carolina	No; substituted materials and methods	Yes
North Dakota	Maintenance just beginning. Highways are just being completed	Yes, where improved by state or federal aid
Ohio	Yes; reconstruction jobs have been postponed	All state roads will be put in suitable condition
Oklahoma	No	About as usual
Oregon	No	Not on new construction
Pennsylvania	On some of the less important roads, yes	Yes
Rhode Island	Yes, omission of bituminous surface treatment on roads of lesser importance	Not entirely, because of necessity for reconstruction with heavy foundations beyond scope of our funds.
South Carolina	To some extent, due to lack of labor	We are making every effort at this time to do maintenance that will be effective through the winter months.
South Dakota	Yes	The best conditions will permit.
Tennessee	Only when forced to	No
Vermont	No	We expect so
Virginia	Yes	So far as possible
Washington	Not to any appreciable extent	They will, except in the case of one trans-Cascade highway always blocked by snow for 5 to 7 months every winter, without attempt to keep open.
West Virginia	No	Yes, we think so.
Wisconsin	Delayed in some cases on account of lack of material	We believe so

of maintenance are handicapped to some extent by inability to secure materials, especially asphalt and tar products. The shortage seems to be less general than the labor shortage and to be due chiefly to transportation difficulties.



PENNSYLVANIA ROAD PATROLMAN'S CART EQUIPPED WITH TOOLS.

Table III contains the replies to question 8 and 9—"Have you curtailed maintenance on any of your highways because of lack of labor or material?" and "Will all of your main highways be put in proper condition to go through the coming winter?" The replies to the first question, No. 8, show some curtailment of maintenance work in the majority of the states, though in a number of cases it does not seem to be serious. On the other hand, the replies to question No. 9 indicate a general belief that the roads will be gotten into proper condition before the end of the season.

The replies to question No. 10 ("What suggestions have you to make relative to correcting adverse conditions?") are interesting. The tenor of the majority is, perhaps, best illustrated by the reply received from one of the southern states: "Lick the Kaiser." One answer to this question that is worthy of note is: "Use local materials and keep well ditched and drained." The use of convict labor is suggested by one official and another suggests the use of German prisoners of war for road work. From another state comes the suggestion that the speed of motor vehicles be limited, and two officials advocate the use of motor trucks for dragging and repair work. Several suggest that the Government relieve the present transportation difficulties.



RECENTLY DRAGGED EARTH ROAD—VIEW ON THE LINCOLN HIGHWAY NEAR AMES, IOWA.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

August 24, 1918

THE MAINTENANCE OF STATE ROADS UNDER WAR CONDITIONS

Two reassuring facts are evident from a study of the data on state road maintenance under the adverse conditions brought about by the war, that are presented on other pages of this issue.

The first is that every effort is being made to keep the roads in shape, and the second is that in most cases the coming winter will find the roads in almost as good condition as usual.

Among the many problems that the war has brought to road builders, maintenance is at once the most important and probably the most troublesome.

It is important because the roads are carrying a heavier traffic than ever before, and there is every reason to expect still further increases. This traffic is vital to the success of the United States in prosecuting the war and to the continuance of its industrial and commercial progress. Roads must be made fit to carry it, and the work must be done regardless of cost.

The problem is a difficult one because of the labor shortage, the lack of some of the necessary materials, and the interference with the transportation of materials and supplies. These difficulties are in part the natural result of the withdrawal of men and materials from civilian uses to those of the war establishment, and partly to an apparent lack of appreciation of the importance of road work on the part of the authorities.

In spite of these difficulties, the work has been carried on; not, of course, without interruption in all cases and perhaps not always as efficiently and certainly not as economically as it might be done, but nevertheless with a determination and vigor that have accomplished much. While the returns from many of the states indicate a considerable curtailment of maintenance work, it seems likely that in the majority of the states the handicaps will be sufficiently overcome to put the roads into such condition that they will be able to withstand the effects of winter and winter traffic.

Some of the suggestions offered for meeting the situation are worthy of the most careful consideration. Among these are the use of local materials, the employment of convict labor, and the more extensive use of machinery to meet the shortage of common labor. All of these expedients have been referred to in these columns and their employment to the fullest possible extent has been urged. The whole problem is one of making the best of a bad situation—doing as much as can be done, as well as it can be done under adverse conditions. There is every reason to believe that the state highway officials throughout the country are rising to the occasion and doing quite as well as could be reasonably expected. In many states, indeed, the results obtained are surprisingly good.

The Fiscal Court of Shelby County, Kentucky, has voted to anticipate the 1919 appropriation from the road fund and add it to the present year's appropriation to meet the cost of surfacing the state pike between the Jefferson and Franklin County lines. The estimated cost of the work is from \$700 to \$1,000 per mi., which will make the total cost in the neighborhood of \$25,000.

A Tax on Sign-Boards Along Public Roads has been suggested by J. Denny O'Neil, State Highway Commissioner of Pennsylvania, as a means of raising revenue for road maintenance. Commissioner O'Neil proposes legislation that will tax such signs and suggests that a tax of even \$5 on each board would yield large returns. The real object of such legislation, however, would be to restrict the number of such signs erected. According to Commissioner O'Neil, many of the finest views along the Lincoln Highway in Pennsylvania are being disfigured by advertising signs.

The Store Door Delivery Plan, which was to have been inaugurated in New York City on Aug. 15, has had to be deferred because of the magnitude of the task of making the necessary arrangements. According to Commissioner Harlan of the Interstate Commerce Commission, who was authorized by Director General of Railroads McAdoo to install the system, ample notice of the inauguration of the service will be given. At present, he stated recently, committees of merchants, teamsters and truckmen, railway officials and others are at work gathering information and taking care of the necessary details incident to putting the plan into operation.

The Production of Portland Cement in Denmark has been greatly reduced since the beginning of the war, chiefly on account of lack of fuel, according to Consul B. L. Agerton, of Copenhagen, in a recent issue of the "Commerce Reports." The production in normal times was about 2,730,000 bbls., of about 375 lbs. net, each. About 1,000,000 bbls. were used in Denmark and the remainder was exported. For the past 18 months, it is stated, the production has not been sufficient to meet the demands of the domestic market. The present price is \$6.43 per bbl. as against a price of \$1.34 to \$2.14 per bbl. in normal times. There is no duty on cement brought into the country.

Road Maintenance in North Carolina

A Report on the Method Adopted and the Work Done on the State System of Maintenance

By D. H. WINSLOW†

The Legislature of 1915 provided that the state engineer might, from time to time, take over as part of the state system such highways as were of importance to the state. It did not provide any funds for this purpose.

In 1917, in order to secure federal funds, it was necessary that this state pledge a permanent fund for the upkeep of all federal aid roads, and for this purpose the automobile receipts were accepted as satisfactory to the federal authorities. Whatever funds were in excess of the amount required were to be used for the maintenance of a system of state roads.

This system will take in about 3,500 mi. of road, and the selection of these roads rests with the local and state authorities. It will connect practically all county seats and large cities and towns. Thus far this work has been started in 83 counties, and is satisfactory to most of the counties where any kind of public spirit exists.

One of the first things done was to establish county line signs and also mile marker measured from the county seat in nearly every case. The clock system is used, by which every road east of north is numbered 1, and so on around, like the hands of a clock, until the north line is reached. The roads are thus numbered, and, with the distance known, it is easy to number and mark every bridge and culvert, as well as any point on the road. In addition the Central Highway is marked with blue and white bands, and the Wilmington-Goldsboro Highway with white and yellow bands. Other colors will be adopted for other main lines.

A state map is issued each month posting the road up to date for the traveling public.

The state has been divided into districts independent of political lines, and county and township lines ignored on maintenance, except in the division of the funds as the law provides. All supervisors are provided with a specially constructed automobile to insure prompt attention to the "stitch in time." Perpetual maintenance will be insisted on as far as funds permit. The men are appointed on their merits, and the office knows neither their politics nor religion, but they must know roads or give way to men that do. They are held responsible for as much of the road as they take over, and must show results. Daily reports are insisted upon, and failure to report every 24 hours means a satisfactory explanation or dismissal.

Our great problem has been labor and teams, but we now have 50 tractor trucks, or one for every two counties, and these save 8 mules and 3 drivers in each case. The patrolmen are thus able to cover greater territory, and we are retaining only the best men.

Many of the counties have assisted us with extra money, labor, teams and materials. The justice of the law is shown where wealthy counties use and destroy the roads in adjoining and poorer counties. If the funds are retained in a county or township then the automobiles should not run over the line either.

We lose hundreds of dollars because the automobile laws are not enforced, especially near elections. Narrow tires

add nothing to the life of a road during wet weather, and unless the snow is removed promptly the damage runs up into thousands.

Few counties have paid heed to Chapter 24, page 80, relating to signs, and if this law were enforced we would have force enough to work the roads from convictions alone. This state should have power to purchase land for a permanent base of supplies for road maintenance, as well as a storage base for road supplies and equipment, instead of buying by the load or cubic yard, and for space to build tool-houses and sheds for equipment that now stands out all winter unless we rent space.

The opposition comes largely from parties who have controlled the road funds and not from those who have the entire state in mind.

Unless men take a broad view and pull together we will lose the roads. The war is teaching us this lesson. Loyalty to the state is what we need to learn rather than counties and township lines. Whatever success we have had has been due to this on the part of broad-minded employees and citizens. Where cooperation has prevailed this is a fact, and the man who will not support the state and its laws has no place in North Carolina.

Let us learn to think beyond county and township lines and North Carolina will take its proper place where God intended her to be—at the head of the United States. I yield to no man in loyalty to North Carolina, and her loyal subjects extend from the mountains to the sea.

Fuel Preference for Manufacturers of Horse-Drawn Vehicles

War Industries Board Outlines Manner in Which Aid Is To Be Given

A statement of the position of the War Industries Board on the question of fuel preference for manufacturers of horse-drawn vehicles, along practically the same lines as the statement in reference to manufacturers of motor vehicles printed in the issue of Aug. 17, has recently been made.

Priorities Commissioner Edwin B. Parker has prepared for distribution to the manufacturers of horse-drawn spring vehicles, a circular setting forth what may be expected in the supply of fuel and steel.

As in the case of truck manufacturers, makers of horse-drawn spring vehicles may file with the board applications for places upon the preference list for fuel. The board will place upon such list those manufacturers whose fuel requirements bear a proper relation to the character, nature and volume of their business, upon the condition that the manufacturers pledge their cooperation and agree to observe the regulations of the Priorities Division.

In reference to steel requirements, the circular is as follows:

"Circumstances do not permit the allotment to your industry of sufficient quantities of iron and steel to meet your maximum or even your normal requirements. A careful study of your reports of stocks on hand and of your manufactured and partly manufactured products justifies the allotment to you of a certain agreed maximum which will

*Paper presented at the annual convention of the North Carolina Good Roads Association, Wilmington, N. C., Aug. 7-9, 1918.

†State Maintenance Engineer, North Carolina State Highway Commission.

enable you to liquidate your present stocks. This allotment will be made and your requirements within this maximum are hereby given a class C priority rating, conditioned, however, that each manufacturer participating in the allotment shall execute, file and observe the pledge of cooperation in the terms hereinafter set out."

It is pointed out that in giving a class C rating, the War Industries Board does not guarantee that the industry will receive materials so allotted, but merely that orders may be placed and deliveries made when such orders are reached in their order of precedence.

The pledge of cooperation which dealers are required to give is similar to that required of motor truck manufacturers. This was given in full in the issue of Aug. 17.

Paving in Pennsylvania Cities

Work Done in 1917 in Twenty-Seven Third-Class Cities Less Than That Done in Previous Year

Data compiled by the Bureau of Municipalities, a branch of the Pennsylvania State Department of Labor, shows that 27 third-class cities in Pennsylvania laid 27 mi. of street pavement in 1917, as against 44 mi. in 1916.

The yardage laid in 1917 in 31 third-class cities was 454,796 sq. yd., divided as follows: Sheet asphalt, 205,831; brick, 111,862; Filbertine, 67,000; wood block, 14,836; Amiesite, 14,268; bitulithic slag, 13,132; Hassam bicomac, 12,465; concrete, 11,411; granite block, 1,967; asphalt block, 1,791; stone block, 233.

Oregon Road Contracts

State Highway Commission Awards Work on Three Important Roads

The State Highway Commission of Oregon has recently awarded contracts for grading about 15.5 mi. of road and macadamizing 1.5 mi. of road, at a total cost of about \$80,000.

The grading contracts covered 9.55 mi. on the Elgin-Minam Road and 6 mi. on the Union-Tolocasset section of the old Oregon Trail. The work was awarded to the County Court of Union County on bids of \$37,410 and \$27,484, respectively. These figures, it is stated, are from \$9,000 to \$20,000 lower than the next lowest bids received for the work.

The macadamizing contract was for 1.5 mi. on the Pacific Highway between Divide and Comstock. The contract was awarded to S. S. Schnell at \$14,537.50. At the same time proposals for paving 1 mi. on the Pacific Highway at Ashland were rejected as too high. The work is to be done by the commission.

Paving Commission Ends Work

War Halts Operations of the Commission in Charge of Repaving in Baltimore, Maryland

The Paving Commission of Baltimore, Md., which, since its creation seven years ago, has repaved about three-fifths of the old city, will retire on Sept. 1. The war is given as the cause of the abandonment of the work, and it is expected that it will be taken up again when conditions permit.

The commission was appointed in May, 1911, and has expended approximately \$7,000,000 with which it has replaced about 2,450,000 sq. yd. of old cobblestone pavement with modern surfaces. The new paving laid includes about 1,640,000 sq. yd. of sheet asphalt, 490,000 sq. yd. of granite block, 562,000 sq. yd. of brick pavement, 92,000 sq. yd. of bituminous concrete, and about 72,000 sq. yd. of wood block, cement and other pavements.

When the commission commenced work it was estimated that a \$10,000,000 fund would be required to repave the cob-

bled streets and public alleys within the old city limits, and it was expected that the work would require about ten years. The funds first available consisted of a paving loan of \$5,000,000 authorized by the Legislature and approved by the voters. Later a special paving tax was provided which was expected to raise the balance of the \$10,000,000 required. To date it has yielded about \$1,260,000. Later the Legislature granted the city authority to borrow money in anticipation of the tax in order to expedite the work.

The commission will leave an appropriation of about \$1,000,000, none of which has been used, as no new work has been commenced this year because of high costs.

Illinois To Do Its Own Road Work

High Bids Submitted for Road Work Result in Decision to Employ Force Account Method

The Division of Highways of the Department of Public Works and Buildings of Illinois has been forced to undertake its own road building as a result of the high cost of contract work, according to a recent report.

It is stated that the fluctuation of prices for material and labor has forced Illinois contractors to add so much to their bids that the state has seen an opportunity to save a considerable amount by adopting the force account method. The state formerly did a considerable amount of work on its own account, and is in possession of more or less machinery and other equipment. Four outfits are to be put to work, two on the Dixie Highway near Milford in Iroquois County, one near West Chicago in Dupage County on the Lincoln Highway, and another on the Lincoln Highway near Malta, De Kalb County.

It is expected that the state will build about 8 or 9 mi. this year, but that next year a considerable amount will be undertaken. The work is being done on those sections of road which are almost impassable in bad weather.

Virginia Takes Old Toll Road

The Valley Turnpike in the Shenandoah Becomes Property of the State

The Valley Turnpike in the Shenandoah Valley of Virginia is to become the property of the state on Sept. 1.

The turnpike was established by an act of March 3, 1834, which incorporated the Valley Turnpike Co. for the building of a road from Winchester to Harrisonburg. A subsequent act, passed on March 24, 1838, extended the road from Harrisonburg to Staunton. The company had a capital stock of \$425,000, paid in, three-fifths being owned by the state. It owed the state \$25,000 with accrued interest from February, 1841, bringing the total indebtedness to \$115,000 which was secured by a mortgage on the property.

The road is 92 mi. long and is a limestone macadam, which has received bituminous surface treatment. Besides the culverts there are approximately 100 steel and concrete bridges on the road, most of which have recently been constructed at a cost of about \$100,000. The total assets of the company are estimated at \$633,000, divided as follows: 92 mi. of road at \$5,000 per mi., \$460,000; bridges, \$100,000; 13 toll houses, \$20,000; road machinery, \$8,000; cash deposit in banks, \$45,000.

Better Care of Road Machinery is being urged by the Missouri State Highway Department. It is pointed out that there has been a material increase in the cost of equipment of this kind and it is urged that every effort be made by county authorities to keep their machinery in proper condition.

Who's Who for Good Roads

Men Prominently Identified with Highway Development.

From time to time we print on this page biographical sketches of the men who build the country's roads and the men who develop highway transportation—men who as a class are playing a most important part in the making of the nation. It is our hope that these brief sketches and the portraits will serve to bring closer together the earnest workers all over the country who are devoting their lives to this great work.

Bayard McIntosh Atwood

State Engineer of Arizona

Bayard McIntosh Atwood, State Engineer of Arizona, was born at Darien, McIntosh County, Georgia, Dec. 3, 1875, of French and Scotch parentage. His early education was received at a private school and at the public schools, and at the age of 14 he entered the Middle Georgia Military and Agricultural College. He spent the next year at the Georgia School of Technology and the succeeding four years at the Alabama Polytechnic Institute, where he took a special course in engineering and mechanics. During his years at college he was prominent in athletics, acting as captain of the football team of Alabama Polytechnic.

On leaving college in 1896, Mr. Atwood became a fireman on one of the Hilton Dodge Lumber Company's log trains, but was soon promoted to bridge and office work. He spent two years working for contracting companies on bridge, wharf and concrete work, and in June, 1898, entered the employ of the U. S. Engineer Department in the Savannah district. He remained in this service for eight years on river, harbor and fortification work, and in regulation work on southern rivers. In February, 1903, he was appointed a member of the Board of Civil Service Examiners, Savannah District, for the Engineers' Service at large.

Early in 1906 he secured a furlough and went into the lumber business in eastern Tennessee and northern Alabama, but returned to the U. S. Engineering Department in May of that year, and was transferred to the Chattanooga District. He continued in this work for three years, acting as assistant superintendent on the Tennessee River regulation work. In January, 1909, he resigned and went west, and was engineer on several short bridge and construction jobs in California, Arizona, and Nevada, serving for a time in 1911 with the U. S. Reclamation Service in Salt River Valley.

In December, 1911, Mr. Atwood was appointed an assistant and division engineer in the Engineering Department of the State of Arizona. He continued in this work until 1917, when he was appointed state engineer.

Frank Foster Rogers

State Highway Commissioner of Michigan

Frank Foster Rogers, State Highway Commissioner of Michigan, was born in Raisin Township, Lenawee County, Mich., Aug. 30, 1858. He received his early education in the public schools of Michigan, and later, attended the Raisin

Valley Seminary, which he left to enter the Michigan Agricultural College in 1879. He graduated from the latter in 1883 with the degree of B. S., and was later given the degree of C. E.

After graduating from college, Mr. Rogers followed his profession in Marlette, Sanilac County, until 1890, when he moved to Port Huron, continuing in the same line of work. The following year he was made city engineer, and held that office for four two-year terms. He was appointed deputy state highway commissioner of Michigan when the State Highway Department was first organized in July, 1905. He continued in that office during the administrations of Commissioners Horatio S. Earle and Townsend A. Ely, and on the latter's retirement in 1913 was elected to succeed him. He was reelected on April 7, 1917, his present term expiring June 30, 1921.



B. M. ATWOOD.



F. F. ROGERS.



J. A. FRENCH.

James Adams French

State Highway Engineer of New Mexico

James Adams French, State Highway Engineer of New Mexico, was born at Washington, D. C., Jan. 27, 1866. He was educated in the public schools of Washington and at Georgetown University.

From June, 1883, until April, 1886, Mr. French worked as rodman and assistant in the U. S. Coast and Geodetic Survey on work along Long Island Sound, the North and East Rivers, and harbors in the vicinity of New York. In 1886, he went to work for the Greely, Carlson Co., engineers, in Chicago, Ill., and later in the same year became a draftsman with the Chicago, Burlington and Quincy Railway, where he worked for a few months on reconnaissance and location work in the mountains of Colorado. In November, 1886, he became an assistant engineer in the Maintenance of Way Department of the Union Pacific Railway, continuing in that position until February, 1888, when he became assistant to the city engineer of Santa Barbara, Cal. He remained there until September, 1888, when he again joined the forces of the U. S. Coast and Geodetic Survey as a topographer on work in the Coast Ranges in Monterey County, California.

In 1889, Mr. French went to Alaska with the Coast Survey, and was engaged on the determination of the 141st meridian, the eastern boundary of Alaska. During the two years he spent in Alaska he did a great deal of reconnaissance and exploration work, and at one time made a mid-winter trip of 1,200 mi. in 72 days.

In 1891, he returned to the coast, and was engaged in city engineering work in San Francisco and Stockton, Cal., until March, 1892. He then became assistant engineer on

the construction of the Sunnyside Canal in Washington, where he remained until September of the same year, when he became assistant engineer with the Colorado Irrigation Co. at Yuma, Ariz. In 1893, he moved to Washington, D. C., and served as inspector, foreman, and general foreman in the Sewer Division of the Engineering Department of that city for ten years. He also served some of the time as assistant engineer on street improvements.

In 1899, Mr. French secured leave of absence and went back to Alaska, where he spent several months on topographic and hydrographic surveys for the Coast Survey.

In 1902, he entered the Reclamation Service, in which

he remained until 1912. During this period he had charge of the construction of divisions 1, 2 and 3 of the Fort Shaw Unit of the Sun River Project in Montana, and was engaged on various projects in North Dakota, Montana, Wyoming, and New Mexico.

In July, 1912, Mr. French resigned from the Reclamation Service to become state engineer of New Mexico, a position which he still holds.

With the passage of the present law he was appointed state highway engineer.

Mr. French was elected a member of the American Society of Civil Engineers in 1909.

MOTOR VEHICLE TRANSPORTATION

Motor Truck Contracts Awarded Motor Transport Service Lets Contracts for Army Type AA Machines

The Motor Transport Service awarded contracts on August 5 for the construction of Type AA trucks to the following companies:

J. C. Wilson Truck Co., Velie Motors Corporation, Dort Motor Car Co., Elgin Motor Car Corporation, Standard Motor Truck Co., Lexington Motor Co., Auburn Auto Co., Hupp Motor Car Co., General Motors Truck Co. and the Saxon Co.

The type AA truck, as noted in "Good Roads" for Aug. 10, is a $\frac{3}{4}$ to 1-ton machine, and is one of the standard models decided upon by the Board of Automotive Engineers for the War Department.

Curtailment of Passenger Automobile Production

Further Explanation of Position Taken by the War Industries Board

As noted in "Good Roads" for Aug. 17, the War Industries Board recently advised automobile manufacturers to discontinue the building of passenger cars by Jan. 1, 1919.

A meeting of the War Industries Board with a committee of 25 automobile dealers representing the National Automobile Dealers' Association was held at Washington on Aug. 10. The War Industries Board has authorized the following statement covering facts developed at that meeting:

"1.—While no order has been issued by the War Industries Board canceling motor car production, and no definite order of curtailment could be given until the automobile manufacturers had submitted inventories of present stocks, the board has suggested to manufacturers of automobiles that they undertake to get war work even up to 100% if possible by Jan. 1, 1919. Automobile manufacturers have already accepted war orders aggregating between \$800,000,000 and \$900,000,000.

"2.—The War Industries Board realizes the importance of a continuation of all possible industrial activity so far as it can be brought about without interference with the war program.

"3.—All automobile dealers, however, should put themselves, as rapidly as possible, on a war basis, in order to be ready for whatever curtailment may become necessary.

"4.—The War Industries Board has not classed the automobile or any other industry as non-essential, and in determining the standing and position of any and every industry it will be guided solely by the war requirements and the needs as distinguished from the wants of the civilian population.

"5.—In view of the fact that the war requirements of steel and rubber exceed the supply and make automobile curtailment necessary, the war service committee of the National Automobile Dealers' Association has agreed to recommend ways and means to stop the unnecessary use of passenger cars and increase their utilitarian uses."

Maryland to Tax Foreign Trucks Machines from Other States to be Registered Under Maryland Law

The licensing of foreign trucks using Maryland roads is contemplated in a plan, which, according to reports, has been worked out by Governor Harrington, Chairman Zouck of the State Roads Commission, and Motor Vehicle Commissioner Baughman.

Since the beginning of the war Maryland roads have been used very extensively by trucks hauling between various points outside of the state. These machines have been permitted the free use of the roads under the reciprocity agreement which Maryland has with other states. It is pointed out that this agreement was intended to cover pleasure cars and an occasional truck, but was not intended to cover the operation of hundreds, even thousands, of foreign machines.

Truck Operating Cost Records Dealer Advances Explanation of Former Failure to Keep Data

The time has arrived when every truck owner is keeping as accurate records of the cost of operating his motor trucks as he does of the cost of operation of his business, according to C. T. Silver, metropolitan distributor of the Kissel Motor Car Co.

"Up to a short time ago," according to Mr. Silver, "a peculiar tendency on the part of the motor truck owners which was in direct contrast to the principles practiced in other departments of their business was that of laxness in keeping accurate figures on what their motor trucks were costing them.

"It was natural that when a business concern was considering replacing their horse-drawn equipment with motor trucks they first wanted to know how much it was costing present truck owners to haul and deliver their goods. Time after time we have not only sent letters with questionnaires to truck owners requesting information on the upkeep and cost of delivering their goods with motor trucks, but have made personal investigations, and, outside of a very small percentage, these owners were not keeping any record of their cost whatsoever.

"Looking up the reason for this condition of affairs it appears that in the early stages of the truck business the

cost of operation was considered extremely important, and practically every firm that changed its horse-drawn equipment to motor trucks carried out a complete and accurate record of expenses in order that it might determine whether trucks were more efficient than the former equipment.

"These records of cost showed conclusively that there was no comparison between the two. The evidence was so overwhelmingly in favor of motor trucks that the cost records were soon neglected and considered unnecessary.

"This same condition is true in a great many instances at the present time where the change from horses to trucks is made. An owner of a truck starts out with the best intentions to keep an accurate record of the cost of operating, but, as in the past, he is so surprised by the enormous work his truck accomplishes in comparison with his former equipment that he tries to forget the inefficient manner in which his business had been operated for so many years. The owner requires only a short time for his figures to show that he cannot afford to operate in the old way.

"But today owners realize that it is a business essential to know to a penny how much it is costing to deliver a load of goods or haul a ton of supplies. Consequently every item in the operation and upkeep of his motor trucks is being as accurately kept as the operating costs of any other department."

Motor Truck Parcels Post from Cincinnati

Success of New Installation Demonstrated by One Week's Operation

One week's operation of the motor truck parcels post service through the section of Ohio and Indiana between Cincinnati and Indianapolis, and through the territory in Ohio traversed by the Cincinnati-Columbus route, has demonstrated the success of the plan, according to recent advices from Cincinnati.

The service was inaugurated on Monday, Aug. 12, and has created a demand for a further extension of the service. It is reported that one of the first new routes to be established probably will extend from Cincinnati to Dayton. Other routes being mapped out will serve part of Kentucky, including the sections lying between Cincinnati and Lexington, Cincinnati and Paris, and Cincinnati and Maysville. Besides the benefits to be derived from the increased facilities for handling mail, the establishment of the routes is expected to furnish a great impetus to road improvement in the sections traversed.

MEETINGS

Calendar of Coming Meetings

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

American Association of State Highway Officials

The date of the annual meeting of the American Association of State Highway Officials at Chicago, Ill., has been changed from Oct. 7-9 to Dec. 2-6.

The meeting will be held in cooperation with the Highway Industries Association. According to present plans, Monday and Tuesday, Dec. 2 and 3, will be devoted to executive sessions of the American Association of State Highway Officials; Wednesday and Thursday, the 4th and 5th, will be given over to a joint convention, and the work of the meeting will be finished on Friday the 6th.

At the annual meeting of the Good Roads Association of Wisconsin at Milwaukee on Aug. 9, the following officers were reelected: President, C. C. Jacobus, Milwaukee; Vice President, Elmer S. Hall, Green Bay; Treasurer, Ernest J. Perry, Fond du Lac; Secretary, William H. Reese, Milwaukee; Executive Secretary, F. A. Cannon, Madison.

The subject of roads received considerable attention at the war convention of the Indiana Commercial Secretaries' Association held at Winona Lake, Ind., during the week beginning Aug. 5. Among those who spoke on the subject were L. H. Wright, Chairman of the Indiana Highway Commission, and M. E. Noblett of Indianapolis, Secretary of the Hoosier State Automobile Association.

PERSONAL MENTION

J. H. Henry has resigned as City Manager of Gary, Fla., to join the Engineer Corps of the Army.

Harvey Booth has been appointed City Manager of Glasgow, Mont., succeeding Charles H. Blitman.

A. R. Hebenstreit has been appointed City Manager of Albuquerque, N. M., to succeed Paul G. Redington.

R. J. F. Calkins has resigned as City Engineer of Everett, Wash., to become associated with the U. S. Geological Survey.

Harry B. Hawes, author of the Missouri law assenting to federal aid and providing for the construction of state roads, has been commissioned a captain in the U. S. Army.

John B. Yeon, whose resignation as Roadmaster of Multnomah County, Oregon, was noted last week, will continue to serve as Superintendent of the Columbia River Highway.

Lewis P. Scott, Assistant Engineer in the Illinois Division of Highways, Department of Public Works and Buildings, has been commissioned a first lieutenant in the U. S. Engineer Corps.

Lieut.-Col. H. L. Bowlby of the 43rd Engineers, U. S. A., has returned to this country after an absence of about three months in France. Colonel Bowlby has been ordered to Camp Humphreys, Va.

Charles Fitzsimmons has been appointed Chief Engineer of Highways for the southwestern district of Pennsylvania, succeeding S. W. Jackson. Mr. Fitzsimmons was formerly assistant to the Chief Engineer.

William Eatchel has been appointed Roadmaster of Multnomah County, Oregon, to succeed John B. Yeon, whose resignation was noted in this column last week. Mr. Eatchel has been Superintendent of Properties of Multnomah County for the past five years.

S. W. Jackson has been promoted from Chief Engineer of Highways for the southwestern district of Pennsylvania to the position of Superintendent of Construction for the entire state west of the Susquehanna River. Mr. Jackson's headquarters will be at Pittsburgh.

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THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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The Cost of a Bad Road

By ROBERT C. BARNETT*

The following example, which is typical of conditions existing in many communities, is cited in order to give a more adequate idea of the possibilities for betterment of highway transportation through a rational expenditure of the same money that is now being wasted on operation.

There is needed careful investigation of traffic and actual measurements of losses on existing roads in order that reliable data may be secured as a basis for projected improvements. The value of the example given herein lies more in the general relations given than in its numerical deductions:

Location of road: Between New London and Hannibal.

Length: 10 mi.

Condition: Old gravel pavement badly worn.

Average density of traffic: 50 automobiles + 53 horse-drawn = 103 vehicles per diem.

Average weight loaded = 1 ton each.

Tractive resistance of pavement: Assumed as 160 lb. per ton.

This is arrived at by considering that the condition of the pavement falls between the extremes described in the accompanying table.

Work done overcoming assumed tractive resistance:

$5,280 \times 10 \times 160 = 8,448,000$ ft.-lb. for one vehicle.

For 103 vehicles per diem (immaterial whether vehicle is propelled by an engine or drawn by a horse):

*Engineer, Missouri State Highway Department.

Work done = $103 \times 8,448,000 = 870,144,000$ ft.-lb. per diem.

One horsepower-hour = 1,980,000 ft.-lb.:

870,144,000

Energy required = $\frac{870,144,000}{1,980,000} = 439.5$ horsepower-hours.

TABLE OF TRACTIVE RESISTANCE.

Kind and Condition of Pavement.	Authority			
	J. B. Davidson, for Good Roads Bureau, Cal. State Auto Assn.	U. S. Dept. of Agriculture.	Missouri Dept. of Agriculture.	Packard Motor Car Co.
	lb.	lb.	lb.	lb.
Loose gravel	263	320	..	..
Average gravel	..	80	..	..
Packed gravel	78	..	..	82
Average value.....	170	200	..	..
Earth road, mud on top..	218	..	251	..
Average condition.....	..	..	90	99
Earth road, dust on top..	99	..	..	..
Average value.....	159	..	170	..
Unsurfaced concrete.....	27.6	..	..	30

Gasoline consumption assumed as 1.2 pt. per horsepower-hour.

Gasoline required: $1.2 \times 439.5 = 527.4$ pt. per diem.



TWO BADS ROADS—EXAMPLES OF HIGHWAYS THAT EXACT A TOLL GREATER THAN THE COST OF THEIR IMPROVEMENT AND UPKEEP.

Lubricating oil consumed at the rate of 1 qt. of oil to 10 gal. of gasoline (80 pt. of gasoline).

527.4

Lubricating oil required = $\frac{527.4}{80}$ = 6.6 qt., nearly.

Daily cost of gasoline and oil:

527.4 pt. of gasoline at 3 ct. = \$15.82

6.6 qt. of oil at 10 ct. = .66

\$16.48

Cost of automobile tires on gravel road:

1 set good for 2,500 mi., cost \$80.

2500

— = 250 trips, cost \$80.

10

80

Cost of 1 trip = $\frac{80}{250}$ = 32 ct.

250

50 automobiles per day = 50 trips.

Daily cost = 50 x .32 = \$16.

Summary of daily cost of operation:

Gasoline and oil, \$16.48

Automobile tires, 16.00

\$32.48

Annual cost:

365 x \$32.48 = \$11,855.20.

No account is taken of the extra wear on vehicles, iron tires, nor engines, nor the depreciation of land values.

Conclusion: The annual burden of keeping this bad road bad is at least \$11,855. This is, of course, first borne by the

Reducing this to dollars, there results:

82.5% of 16.48 = \$13.60

67 % of 16.00 = 10.70

\$24.30 = daily saving.

Annual saving = 365 x 24.30 = \$8,869.50; say \$8,870.

If this saving were concentrated in one fund, it would be available for paying interest on a bond, issue and for establishing a sinking fund to replace the wearing surface of the pavement.

Assume the pavement, 16 ft. wide, 6 in. thick, to cost \$1.50 per sq. yd.; also that the top 2 in. of wearing surface is to be replaced in 25 years.

Cost per lin. ft. of pavement = $\frac{16}{9}$ x 1.50 = \$2.67.

Total cost of pavement = 52,800 x 2.67 = \$140,976.

One-third of this to be replaced in 25 years.

140,976

Sinking fund to produce — = \$46,992.

8

Annuity required to produce \$1 in 25 years at 3½% = \$0.02567.

Total annual payment to sinking fund = 46,992 x .02567 =

\$1,206.28

Interest on bond issue of \$140,976 at 5% =

7,048.80

\$8,255.08

Surplus = 8,870 — 8,255 = \$615 per annum.

It should be noted that no change in grade nor alignment

PRESENT
ROAD

\$6015
GASOLINE AND OIL

\$5840
TIRES

\$11855

IMPROVED
ROAD

1051 | \$1935
G&O TIRES

\$7049
INTEREST

\$11241

S.F.

GRAPHICAL COMPARISON OF COSTS OF IMPROVED AND UNIMPROVED ROAD.

owners of the vehicles, some of whom are abutting property owners, but in the end the effect filters all through the communities along the road. As the traffic grows this annual burden will increase therewith.

It is next in order to see how this yearly outlay of \$11,855 might, by forethought and judicious management, be expended so that the traffic would be benefited.

If a hard, smooth pavement were put down, the life of tires would be materially lengthened and the tractive resistance of the road would be much reduced. The type of pavement to be used could not, of course, be determined with regard to these two factors only, but they should be taken into account. An asphaltic pavement, a brick pavement, a concrete pavement, or any one of the types classified as "hard surface," would give low values for both tractive resistance and tire wear. Using the concrete pavement as an example, and assuming the tractive resistance as 28—a value between those given in the table previously used—the following would result:

28

Amount of work done = $\frac{28}{100}$ = 17.5% of that on the existing road.

100

Saving = 100 — 17.5 = 82.5% on gasoline and oil.
Saving on tires 67%. (See note.)

Note.—This value was arrived at by a consideration of the statements of a number of automobile owners, exact data not being available. Some of these motorists had driven almost exclusively on paved streets and reported their tire mileage at from 6,000 to 8,000. Others had used country roads chiefly, and had made from 2,000 to 3,500 mi. per tire.

is suggested in the above example. Undoubtedly further economies could be assured by a careful study of existing conditions and a readjustment of line and grade made thereby.

The foregoing is typical of the waste that is going on in fairly thickly settled communities all over the country. Because the burden is distributed over the many users of our bad roads, it is not appreciated and they have not, therefore, been insisting upon a betterment of conditions.

However, it is now more urgent than ever that waste in highway transportation be reduced to a minimum, since our country is at war. Therefore, it is incumbent upon those in authority to investigate and to measure immediately the large wastage due to bad roads, so that an intelligent effort can be made to overcome the present large losses as rapidly as possible.

The Oregon State Highway Commission had available on Aug. 5 an unexpended balance of \$1,373,069.66. This is the amount left from the sum of \$3,433,127.56 accumulated from the four funds available for road work.

The City of Portland, Oregon, is now the owner of 700 acres of land in the tract known as Benson Park on the Columbia River Highway. The greater portion of Benson Park was purchased by S. Benson and donated to the city, while the remainder was deeded to the city by the Federal Government. The last transfer was made recently when 53 acres between Multnomah and Wahkeena Falls were deeded to the city by Mr. Benson. This particular area has been involved in a controversy over an estate, and the title to it was only recently secured by Mr. Benson.

Government States War-Time Highway Policy

United States Highways Council Issues Regulations for Road and Street Work
Effective September 10

The United States Highways Council made public on Friday of last week its regulations governing road and street work during the war. These regulations, which become effective Sept. 10 are as follows:

1.—All proposed highway, street, culvert and bridge construction, reconstruction and maintenance involving (a) the issuance of bonds, (b) the use of rail or water transportation, (c) the use of coal or oil as fuel, or, (d) the use of cement, brick, asphalt, oil, tar, crushed stone or steel (also sand and gravel where shortage exists) as highway material, should first be submitted for approval to the United States Highways Council through the appropriate state highway department. Forms have been prepared for this purpose and a supply placed with each state highway department. No manufacturer will furnish any road building material until the project has been approved by the United States Highways Council.

2.—The council again urges that new highway and street construction be confined to the most essential needs. If this is done there will be a far greater probability that the work thus selected can be promptly and effectively carried through to completion than if an amount far in excess of the available facilities were to be undertaken.

The council in passing upon the projects which come before it will give first consideration to maintenance, with a view to conserving all the highways already completed if possible.

Reconstruction will be favorably considered by the council only where it is clearly established that maintenance is no longer possible except at prohibitive cost.

New construction will be given consideration by the council in the following relative order of importance:

- (1) Highways and streets of military value.
- (2) Highways and streets of national economic value.
- (3) Unfinished contracts involving contractual obligations (incurred prior to April 5, 1918, where bond issue is involved), which may not be disturbed without serious consequence.
- (4) Streets and highways which although not of national importance are of such extreme local importance, or the construction of which has progressed to such a point, as to cause serious hardship if their construction or completion is postponed.

The council is hopeful that the selective consideration of new highway and street construction by the township, county and municipal officials and in turn by the state highway departments will so materially eliminate the less essential projects as to make it possible for the council to render active aid on the projects it approves. The aid contemplated will be in the form of such action by the other Government agencies involved as will remove obstacles to the speedy completion of the projects.

3.—By way of definition of highways of military and national economic value, the council offers the following:

(a) A highway of military value is one used regularly for the transportation of military supplies in considerable quantity; for the movement as an established practice of army truck trains, or which is essential to the efficient operation of a military cantonment, post or plant.

(b) A highway of national economic value is one which serves or will serve, if properly improved, directly to promote the welfare of the nation and not merely the local welfare. As examples it may be stated that in this class would be placed (1) highways which although not directly used for

military purposes yet serve to help win the war by greatly facilitating the output or movement of war munitions and supplies; (2) highways which can clearly be shown to relieve congestion on railroad lines in a territory which is actually in need of such relief; (3) highways which give access to or promote the output of natural products needed by the nation to a marked degree; (4) highways which further housing operations undertaken by the Federal Government or by other agencies with the approval of the Federal Government would justify at times this designation.

4.—State highway departments are requested to give most careful consideration to each application on its merits in the light of the policy announced by the council and to exercise the power of disapproval freely. Only the projects approved by the state highway department will be considered by the council unless the department itself is in doubt and wishes a decision in the nature of a precedent.

5.—The council will shortly begin, in cooperation with the Office of Public Roads of the Department of Agriculture and the state highway departments of the several states, the preparation of a program of road and street construction, reconstruction and maintenance throughout the United States for the working season of 1919. The purpose of the program is to obtain an approximation of the character and amount of street and highway work deemed essential in 1919, together with an approximation of the amount and character of financing required, the amount and character of the various materials entering into the work, the extent to which rail and water transportation will be involved, and the probable demands upon the labor supply. The preparation of the program in each state will be directed by the state highway department, and will cover all state, county, township and municipal highway and street work.

6.—For the information of the state highway departments as to procedure, forms are attached as follows:

Form H. C.-3. Application to United States Highways Council for approval of project. This form should be filled out and signed by the public officials who are seeking approval of the project and should then be filed with the state highway department. If the state highway department approves the application it enters appropriate recommendation and certification on the last sheet of the form and transmits the application in duplicate to the United States Highways Council. The application is then given a serial number and its receipt acknowledged. It is then considered by the council and appropriate references made to the respective Government agencies interested. The applicant and the state highway department are duly advised as to action taken. Forms F1 and F2 comprise application for approval of delivery of bituminous materials and certification of the application by the state highway department. These forms have been superseded by Form H. C.-3, but may be used if so desired where only bituminous materials are required.

Form H. C.-4. Schedule for use in submitting program of proposed highway and street work during the working season of 1919. This schedule is to be made up in four groups: namely (1) state, (2) counties, (3) towns, townships or districts, and (4) municipalities. For each of these groups three schedules, respectively, construction,

(Continued on page 83)

The Use of Modern Machinery in County Road Construction*

By C. B. SCOTT†

The question of the use of modern equipment in county road construction is a subject of great importance, particularly at this time when labor and material are both high in price and difficult to obtain. It is a subject which has so many ramifications that a volume might easily be written without exhausting it.

We, in the South Atlantic states, have heretofore had a comparative abundance of cheap labor and have, therefore, been prone to use labor where it would sometimes have been more economical to use machinery. Now conditions have changed and labor is costly and often cannot be gotten at a reasonable price. As is always the case when the demand for labor is greater than the supply, it becomes less efficient and more irregular, thus adding to both the cost and delays in the execution of work.

In a discussion of this nature it will be impracticable to give more than a brief description of the various modern machines and devices which are being used so advantageously in road construction and point out some of the new ways in which they are being used.

For clearing right of way, stump pullers are usually more economical than explosives and should be used when time will admit.

Drag or slip scrapers are made in the following sizes: No. 1 of 7 cu. ft. capacity; No. 2 of 5 cu. ft. capacity, and No. 3 of 3½ cu. ft. capacity. From four to ten drag scrapers should be used to constitute a force, depending upon the length of haul. They are very efficient up to a haul of 100 ft., and can be used with economy up to 200 ft. Except when the material is soft it should be loosened by a plow or other suitable means.

A two-horse team and scraper can move the following amounts of loose material in a working day of 10 hours on the average:

For a haul of	25 ft.	70 cu. yd.
" " " "	50 "	60 "
" " " "	100 "	50 "
" " " "	150 "	40 "
" " " "	200 "	35 "

For hauls of from 200 ft. to 800 ft. wheel scrapers are efficient. They are made in four sizes: No. 1 of 10 cu. ft. and No. 2 of 13 cu. ft. capacity; No. 2½ of 15 cu. ft. capacity, and No. 3 of 17 cu. ft. capacity. A snatch team is used for loading No. 2 wheelers except in very soft material and in almost all cases for loading No. 3 wheelers. They should be worked in gangs of from 4 to 6 for hauls up to 400 ft., and the number increased with the length of haul.

In a working day of 10 hours, a two-horse team and scraper can move, on the average, the following amounts of loose material:

For a haul of	100 ft.	60 cu. yd.
" " " "	200 "	50 "
" " " "	300 "	40 "
" " " "	400 "	30 "

Neither drag nor wheel scrapers will carry loads equal to their rated capacity and in rough materials the loads are often considerably reduced. In the construction of embankments with scrapers, the embankments are compacted to such an extent that there is little future settlement—which is of considerable advantage where a pavement is soon to be laid.

Of recent years the Maney four-wheel scraper has come

into use. It has the advantage of carrying a load from 1 to 1½ cu. yd., and can be used economically for hauls from 200 ft. to 2,000 ft. A tractor or hoist is best for loading, but a snatch team can be used for that purpose.

Road machines, or graders, are made in many styles and weights. The light two-wheeled style is used largely for very light grading and shaping. A very heavy four-wheeled machine is being used in this section for quite heavy grading and bids fair to be a great labor saver. In the construction of broken stone and gravel roads, a road machine can often be used for shaping the roadbed and for spreading the stone or gravel, thus considerably reducing the amount of labor used.

Elevating graders, which have been successfully used in excavating irrigation canals in the western states, may be found suitable for road construction under some conditions. They are made in three sizes—large, standard and small—and require from 10 to 16 horses for motive power, or a tractor of equal power.

Trench excavators may find a place in road construction where it is necessary to construct a considerable amount of drainage ditches, particularly when the work is done in cooperation with adjacent property owners. The continuous bucket or wheel type of excavator is probably best adapted to work of this character. These machines are made in several styles and sizes. Steam shovels of the revolving and sliding beam type are adapted to grading, and in heavy work should prove decidedly economical. In stone quarries they may be used to advantage in loading stone into cars for crushing or where it is necessary to store large quantities of stone in piles for reloading.

Narrow gauge locomotives and cars can be used economically more often than is generally supposed, particularly in hauling stone, gravel, sand, etc., for broken stone roads of bituminous or cement concrete construction.

Dump and spreading wagons are very useful and great labor savers where the length of haul is not too great. The various types are too numerous to mention, though the essential features are practically the same.

Motor trucks and trailers are rapidly coming into use and are proving satisfactory. For construction purposes somewhat larger trucks are generally preferred than where they are to be used for maintenance. It is usually best to purchase trucks of the same make, where a number are required, to facilitate the interchange of parts and, where only a few are purchased, it is well to select a make which maintains a service station in the vicinity. When desirable, a truck can be advantageously used for pulling a plow, road machine or bituminous distributor.

Tractors are superseding teams to a considerable extent for plowing, road machine work, hauling bituminous distributors, etc. They can also be used for operating a stone crusher for repair work, if equipped with a belt wheel, when not used for traction, and have the advantage of costing very little when not in use.

Standard steam drills are almost essential for quarrying stone, or excavating considerable quantities of it in the roadway. Air drills of the hand type are useful in breaking large stones in quarries and for drilling rock in side ditches and for light rock excavation where they must be moved frequently.

*Paper presented at the annual convention of the North Carolina Good Roads Association, Wrightsville Beach, Wilmington, N. C., Aug. 7-9, 1918.
†Assistant State Highway Commissioner of Virginia.

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

August 31, 1918

ROAD BUILDING A NON-ESSENTIAL OCCUPATION?

The Community Labor Board of the United States Employment Service of the District of Columbia, according to an announcement authorized by the Department of Labor, has issued an extensive list of occupations that are considered non-essential.

Included in the list are "builders and contractors not engaged in the erection of structures for war work; auto trucks engaged in work other than fuel or Government work, and teaming, other than delivery of products for war work."

This ruling, according to press dispatches, "is expected to set a national precedent."

In a statement of the general policy of the Department of Labor, which accompanies the list, certain kinds of "war work" are defined. Among the industries definitely classed as "war work" is railroading. Even this branch of transportation is not given unqualified exemption, for the exact language used is:

"Railroads and farms are engaged in war work to the extent that under this program they are protected from all recruiting by other industries."

Another fact should be noted here. While railroads are excepted to a certain extent—undoubtedly because they provide transportation, admittedly one of the most essential factors in winning the war—there is no mention made of

highways, which are quite as important arteries of traffic as are the railroads.

We do not know the men who make up the Labor Board of the District of Columbia. The natural presumption is that they are men selected because of their knowledge of labor conditions and the labor needs of the country. Taking into consideration the effect of their order upon road building, it is apparent either that they have inadvertently overlooked that very vital calling or that they lack utterly a comprehension of the transportation needs of the country and the relation of the highways to those needs.

If the "work or fight" order is extended to the men registered under the new draft legislation, as at the present writing there is every reason to suppose it will be, this classification will most effectively restrict road construction and maintenance. "Builders and contractors not engaged in the erection of structures for war work; auto trucks engaged in work other than fuel or Government work; and teaming, other than delivery of products for war work," comprise a classification sufficiently broad to include a large part of the labor forces on most road jobs. If the workers to fill these places have to be recruited from the ranks of boys under 18 and men over 45, road building will surely suffer.

Under these conditions it is to be hoped that the action of the District board will not "set a national precedent."

There are certain things, like making munitions and building ships, that are obviously to be classed as "war work;" even the most obtuse can appreciate that.

There are certain other things not so obviously war work, but which are nevertheless essential to the carrying on of the war.

In this latter class there is no one thing that is more truly "essential" than transportation, and the highways are at the foundation of all transportation. It is high time that this fact was recognized by those in a position to make their recognition bear fruit.

Some time ago there was created the United States Highways Council, the duty of which was to coordinate the functions of the different Government agencies exercising authority over road and street work. Notwithstanding the establishment of this body, contradictory rulings and orders are still issued, and while one department of the Government seeks to promote highway transportation others issue rulings and orders which can have no effect except to hinder its development.

THE COST OF BAD ROADS

Communities frequently count the cost of good roads; they less frequently take account of the cost of bad roads.

The reason for this is simple. Building good roads necessitates the outlay of cash or its equivalent. It means a very real diminution of the public funds or the public credit and is quite apparent to the taxpayers. Continuing to use bad roads costs the taxpayers as much—usually more, but they do not always realize what they are paying for, because the actual expenditures are for tires, wear and tear on vehicles, gasoline and oil, and a hundred other items of a similar nature.

How much some of these costs amount to under given conditions is shown in an article on other pages of this issue.

Under almost any conceivable circumstances, road improvement is a paying proposition. Bad roads almost always cost more than good ones, and money spent for their improvement is an investment that will bring large returns.

More prominence given to the cost of bad roads and less to the initial outlay required for their improvement would result in more good roads and better care of those already improved.

Work of the Highways Transport Committee

An Authorized Statement Setting Forth the Aims of the Committee and Outlining What Has Been Accomplished

The work of the Highways Transport Committee, Council of National Defense, this committee having been appointed to make the most effective use possible of the highways as one of the means of strengthening the nation's transportation resources, is now being developed in such a way as to take in every state in the Union. Further, through the medium of state highways transport bodies functioning with the national body, this organization is being developed in some states not only down to the districts, but to the counties and even communities.

The state highways transport bodies are a part of the State Council of Defense. They consist of the following:

The chairman of the State Highways Transport Committee, five members of the highways transport body and a secretary.

The five members in question are named to represent areas of varying sizes and populations, each of the five members being chosen from one of such five different areas and in turn serving as chairman of his district committee. The district boundaries are laid out in harmony with existing conditions, the aim being that the most effective results possible may be brought about. For instance, in one locality large population centers may be found to be best as the heart of one or more districts. Again, in other sections, where cities of large population are not found, the district boundaries may be made to embrace agriculture, lumber, oil or other areas.

Such highways transport committees have been organized in practically all of the states of the Union, and are now functioning not only as a part of the State Council of Defense, but with the national body at Washington. While in some states the work in detail has gone forward to a most gratifying extent, thus pointing the way to those in which the state highways transport body has been more recently organized, without exception efforts looking to the desired end in all states are being made.

The main activities of the national and its allied highways transport bodies are for the present being devoted directly to the following main activities:

Return load bureaus, rural express, cooperation with federal railroad administration, transport operating efficiency.

These activities may be briefly interpreted as follows:

Return loads bureaus: Elimination of empty running of trucks by the bringing together of shipper and truck owner in a systematic way so as to provide a full load wherever possible.

Rural motor express: Rapid development of the use of the motor truck in regular daily service over a fixed route with a definite schedule of stops and charges, gathering farm produce, milk, live stock, eggs, etc., and on the return trip carrying merchandise, machinery, supplies etc., for farmers and others along the route.

Cooperation with federal Railroad Administration: Taking of congestion from crowded rails on to the open highways and also freeing terminals from railroad and express congestion.

Transport operating efficiency: The making of transportation more efficient, which end will be sought through encouragement of such use of highways transport as will operate to avoid the making of trips, with only part loads; also, briefly, the elimination of waste efforts, man power, and time in loading and unloading.

Typical of the work being done by some of the state highways transport bodies, that already inaugurated in such representative states as Connecticut, New York, Pennsylvania, Michigan, Illinois and Colorado may be suggested. For instance, resolutions recently adopted at a meeting of the Michigan Highways Transport Committee point the way to the manner in which that enterprising state is aiding in this vital phase of the war work.

Resolutions, in part, recommend that intercity and rural motor express and return loads bureaus be established where practicable in every part of the state; that steps be taken to have the state constitution amended and suitable legislation enacted to aid in the granting of franchises, properly restricted; for organizing and equipping motor express lines.

Again, in Pennsylvania, an organization down to the county has been perfected and noteworthy development has been brought in such counties as Allegheny, Butler, Clinton, Lawrence, Luzerne, McKean and Tioga. Pennsylvania co-operated most effectively during the heavy snows of the past winter to the end that routes selected for Government motor truck trains on their way from points north to seaboard were cleared of snow and the overland trips, the first attempted by the Government, made possible. In this work Michigan also lent a hand most effectively.

In Illinois the transport division, Highways Transport Committee, has gone to bat in a manner which promises to set a pace for other states to follow, and entirely good-natured rivalry already is on to see which state will be able to produce the most effective results in the most approved manner in the shortest space of time. The Illinois committee has worked out a compact plan of organization, and drawn up a method of procedure.

It has established a return loads bureau in Chicago, located at the headquarters of the State Council of Defense, and preliminary steps have been taken looking to the establishment of subsidiary bureaus in some of the larger towns between which and Chicago there is considerable movement of freight.

Connecticut was the first state to organize completely, with a return loads central bureau at Hartford. It has numerous flourishing bureaus outside of Hartford, equipped with telephone service so that delays in the transmission of orders may be eliminated. The Hartford bureau is constantly on the alert to the end that interested persons such as truck owners, merchants, farmers and manufacturers, may know just when and where return loads service is available.

From Denver comes information, through Tom Botterill, chairman of the state highways transport body, that a gratifying number of intercity motor express routes are now in operation in Colorado, and that within a short time these will be organized as rural motor express routes in harmony with the plans of the national highways transport body.

The establishment of return loads bureaus throughout Colorado also is being given intensive study, and the state highways transport body is confident of being able shortly to have this vital war activity in operation.

The Oregon State Highway Department is planning to employ women wherever practicable on state highway work in order to release men for other service. According to State Highway Engineer Herbert Nunn, the women will be assigned to inspecting, checking and similar work.

Government States War-Time Highway Policy

(Continued from page 79)

reconstruction and maintenance, are to be submitted. Definitions of construction, reconstruction and maintenance, respectively, are given on Form H. C.-4.

Announcement of June 20, 1918: A brief summary giving organization and purposes of the United States Highways Council and showing the relation of various organizations represented on the council to highway work.

Circular No. C. S-13. United States Railroad Administration, rules promulgated to govern car supply for stone, sand and gravel, showing conditions under which open top cars may be supplied by railroads and providing for application to the Director of the Bureau of Public Roads, United States Department of Agriculture, where local car supply is insufficient. The representatives of the organizations mentioned in paragraph 5 of this circular comprise the United States Highways Council.

The Use of Modern Machinery in County Road Construction

(Continued from page 80)

Stone crushers may be considered a necessity for the construction of broken stone roads, and it has been quite a revelation to many of us to learn that they were being so seldom used by the European nations in the construction and repair of military highways. For construction purposes the 10x20-in. size will generally be found most serviceable and there are several makes which are very satisfactory.

Hoists with cable and cars for transporting stone from quarries to crushers and for similar purposes, will usually be found much more economical than wheelbarrows or carts. Frequently such a hoist can be operated by an additional wheel on the shaft of the crusher engine.

Sprinklers for watering macadam and similar roads are very useful. They should be of the cut-under type to permit turning in a small space, and about 400 gal. capacity will generally be found most convenient. Where water from streams is to be pumped directly into the tank it is best to have spraying devices so arranged as to permit passage of the fine sand and small twigs and leaves, otherwise much time is lost in cleaning the sprayers and the caps become battered and worn in handling.

Scarifiers are great savers of labor in the reconstruction of broken stone and gravel roads. Several satisfactory types are made and rollers are being made with scarifiers attached to the rear. The latter machines have the advantage of doing very uniform work and can be set to any depth desired, but will not operate up very steep grades, for lack of sufficient power.

Rollers for compacting the embankments and rolling the subgrade and surfacing material, are a standard part of road equipment and have been developed into very satisfactory and efficient machines. The three-wheel type of 10 to 12 tons weight is usually preferred. They are propelled by steam or gasoline, as may be preferred.

Bituminous distributors, either horse-drawn or motor-driven, are more economical and satisfactory for applying bituminous material than hand work, where a considerable amount of material is to be used. For horse-drawn vehicles about 600 gal. capacity is convenient and such machines should be equipped with heater and pump. Motor-driven vehicles are more elaborate in design and equipment, depending upon the use and amount of work to be done.

Concrete mixers of small size are very useful for constructing end walls for drain pipes, culverts and small bridges. Larger mixers are convenient and economical for use in building large bridges, retaining walls, and in laying

concrete pavement. The size and type desirable depends upon the purpose to which it is to be put.

Stone bins with elevators and screens for separating stone and gravel according to size and storing it temporarily, are very useful and the portable type usually is most economical. About 30 tons capacity, depending upon the size of the crusher, is usually most convenient.

Unloaders operated by motor power for loading materials from bottom dump cars into wagons and trucks have been developed into very useful and economical machines where a considerable quantity of material is to be handled. Another machine of a similar type is used for loading stone from piles. For unloading open-top cars into wagons and trucks car or skip loaders are great savers of time and labor. The 1½-cu. yd. machine is generally to be preferred. This device is attached to the outside of the car and when loaded is dumped into the wagon or truck.

A public official who accepts responsibility for the expenditure of money and labor is in duty bound to make every effort to use the means placed at his disposal in the most efficient manner. He should be mindful of the fact that prison labor is the equivalent of money and he should not waste it or permit it to be wasted by local road officials, where he has control of it. When work is done jointly by the state and counties it is sometimes the case that local officials are inclined to use prison labor too freely to avoid the expenditure of local funds for the purchase of proper equipment.

Under the discipline of a world war we are learning that waste and inefficiency are crimes which are paid for in agony and death, and no one who has the welfare of our country at heart can be unmindful of his duty to utilize the means at his command to the best of his ability.

Cars for Sand, Stone and Gravel

Railroad Administration Issues Supplementary Order on Supplying Open-Top Cars for Materials Used in Road Building

The United States Railroad Administration has issued another order affecting the shipment of three of the important road building materials. The order is designated as Supplement No. 1 to Circular CS-13, and is as follows:

"In accordance with the understanding expressed in Car Service Section Circular CS-13, and to avoid decline in coal loading, carriers will immediately amend their practices regarding car supply for stone, sand and gravel so as to increase cars available for coal loading as promptly and as greatly as possible. Necessary curtailment of open-top car supply for stone, sand and gravel must be effected so as to least affect the movement of raw materials for blast furnace and foundry operations.

"Non-coal producing railroads will be expected hereunder to more promptly return empty open-top cars to their coal producing connections."

Cement Makers' Fuel Curtailed

Fuel Administration Orders a Reduction of 25% in the Supply of Fuel to Manufacturers of Cement

The United States Fuel Administration has authorized the following statement relative to the supply of fuel for manufacturers of cement:

"The United States Fuel Administration has issued an order curtailing the supply of fuel for the production of cement 25%. The cement industry uses a very large quantity of coal, approximately 8,000,000 tons a year, and while a large quantity of cement is now being used for Government and other necessary construction, a careful study

of the cement industry by the building section of the War Industries Board and by the Fuel Administration has shown that considerable quantities of cement are still being manufactured for use in non-war construction, which could be postponed until later.

"Provision is made whereby cement manufacturers may make cement in excess of their 75% allotment, if this excess production is required by the necessities of the Government.

"This order restricting the use of cement for non-war purposes will make available thousands of tons of coal for war use."

New Jersey Roads to Cost Double Original Estimate

System of 655 Miles to Be Built Under Edge Law to Cost \$30,000,000 Instead of \$15,000,000

The 655-mi. system of state highways provided for in the Edge Act will cost \$30,000,000 instead of \$15,000,000, the original estimate, according to a recent statement by State Highway Engineer W. G. Thompson.

When the Edge law was passed it was estimated that the entire system could be improved for \$15,000,000, which was to be raised by a 1-mill tax on each dollar's worth of property in the state, running for five years. In a recent statement, Mr. Thompson pointed out that in the original estimate made in 1916 no allowance was made for bridges, which will cost between \$5,000,000 and \$6,000,000. In addition, the Legislature of 1917 added two highway routes, which will increase the cost by nearly \$4,000,000. He also pointed out that the cost of materials has increased from 50 to 100%, labor from 40 to 70%, and, without counting this increased cost of construction, it would take, in his opinion, at least \$30,000,000 to complete the highway system as planned.

Traffic Routes in New York City

Police Department Prescribes North and South Routes for Commercial and Passenger Traffic

New rules established by the Police Department for vehicular traffic will go into effect in New York City on Sept. 16. The new regulations are designed to facilitate traffic movement through the separation of slow and fast traffic over the north and south thoroughfares of the city. No attempt to extend the regulations to crosstown traffic has been made.

The routes designated for commercial vehicles are as follows: First and Second Ave., between Houston and 125th Sts.; Third Ave., between 5th and 125th Sts.; Sixth Ave., between 3rd and 59th Sts.; Eighth Ave., between Abington Square and 59th St.; Ninth (Columbus) Ave., between 14th and 110th Sts.; Tenth (Amsterdam) Ave., between 14th and 125th Sts.; Park Row, between Duane and Division Sts.; Bowery, between Division and Canal Sts. and between Grand and 5th Sts.; Centre St., between Pearl and Broome Sts.; West Broadway, between Vesey and 3rd Sts., and Hudson St., between Chambers and 14th Sts.

Passenger vehicles are to use the following north and south routes: Lafayette St., between Duane St. and Astor Place; Lexington Ave., between 23rd and 125th Sts.; Vanderbilt Ave., between 42nd and 45th Sts.; Fourth (Park) Ave., between Astor Place and 125th St.; Madison Ave., between 23rd and 125th Sts.; Fifth Ave., between Waverley Place and 125th St.; Seventh Ave., between Greenwich Ave. and 125th St., and Broadway, between Chambers and 125th St.

Portions of two crosstown streets are also included in the passenger traffic routes. These are Canal St., between

Lafayette St. and the Bowery, and 4th St., between Lafayette and West Broadway.

The regulations take cognizance of the fact that it will often be necessary for vehicles of one kind to enter streets set aside for the other kind, by providing that such vehicle must enter the north and south street over the nearest intersecting street and leave by the nearest intersecting street. Vehicles of the Police and Fire Departments, ambulances, fire patrols, United States mail trucks and wagons and vehicles used by the military establishment and by public service corporations are excepted.

Proposed Changes in Colorado Laws

Modification of the Highway Laws of the State Proposed at Meeting of State Good Roads Association and County Commissioners

Changes in the road laws which will permit of greater progress were proposed at a recent joint meeting of the executive committee of the Colorado State Good Roads Association and the legislative committee of the Colorado State Association of County Commissioners. The principal changes as set forth in recent advices are as follows:

1. An increase in the automobile tax which will place the automobile tax on an average with those charged by other states.

2. The transference of the inheritance tax from the general funds to the highway department.

3. The passage of an enabling act which will permit the people of Colorado to vote on a bond issue four years from this time.

Charles E. McLain, President of the Colorado State Good Roads Association, and T. J. Erhart, State Highway Commissioner of Colorado, were the principal speakers at the meeting.

Attempt to Hold Up Highway Work in New York State

Surety Company Enjoins Letting of Contracts by Highway Commissioner

The National Surety Co. has served an injunction upon State Highway Commissioner Duffey of New York, restraining him from awarding contracts for work recently advertised. The surety company bases its action upon the claim that it will sustain a heavy loss because the work advertised was abandoned by contractors for whom the company was surety.

The work involved is in Erie, Monroe, Nassau and Ontario Counties and the contracts were originally awarded in 1916. In each case slow and unsatisfactory progress was made and the job was finally abandoned by the contractor, leaving the highway torn up and dangerous. After both the contractor and the surety company had failed to undertake the completion of the work, the State Highway Department, in accordance with the contract and the law, advertised for bids for its completion. Under the law the contractor and surety company are jointly and severally liable for that portion of the cost of completing the work that is in excess of the original contract price.

A General Road Law for Louisiana will be presented to the Legislature of that state at the 1920 session. A joint committee has been appointed to study the matter and bring in a suitable bill. The speaker of the house has appointed J. S. Douglas, J. W. Alexander and Charles A. Bryne members of the committee.

EQUIPMENT—TRADE—MATERIALS

Finishing Machine for Cement Concrete Pavements

A finishing machine designed to reduce the voids in cement concrete and so permit the use of a larger proportion of coarse aggregate in concrete pavements is shown in the accompanying illustrations.

The machine moves forward under its own power at a speed of 7 ft. per minute, and moves backward at a speed of 28 ft. per minute. As the machine travels forward over the concrete the strike-off in front spreads the material to the necessary depth and crown. A tamper situated just back of the strike-off compacts the concrete, working with a long, hard stroke the first time over and with a shorter, more rapid stroke the second time. The stroke is regulated by the operator, and may be varied for different consistencies of the concrete, as well as for various stages in the tamping process. A float at the back of the machine finishes the surface by means of a belt working across it at a comparatively low speed.

The machine was designed several years ago by E. G. Carr, a California contractor, and was used in the construction of about 400 mi. of California's roads. Since that

sists of 80 pages and covers. It describes briefly the equipment manufactured by the company, including engines of various types, air compressors, pumps, hoists, concrete mixers, generator sets, lighting systems, saws, rock crushers, rock cutting tools, riveters, and other equipment. The portion of the catalogue devoted to compressors is followed by several pages illustrating and describing the use of the machines in road, quarry and other work. The same plan is followed in the part of the catalogue devoted to hoists.

The catalogue is printed on heavy white paper, and is profusely illustrated. It is bound in double covers of heavy brown stock, printed in blue and black.

Acme Motor Truck Folder

The Acme Motor Truck Co. of Cadillac, Mich., has recently issued a folder describing the use of Acme trucks in road building.

The folder is 9x12 in. in size, is printed in red and black, and is illustrated. On the first page is an illustrated description of the use of an Acme truck on a road job in Wisconsin, in which the cost of doing the work with the truck and



LAKEWOOD CONCRETE ROAD FINISHER IN OPERATION ON THE BELLEVILLE-SCOTT FIELD ROAD IN ST. CLAIR COUNTY, ILLINOIS.



time the machine has been improved in various mechanical details, and is now manufactured by the Lakewood Engineering Co. of Cleveland, O.

It is claimed for the machine that by subjecting the concrete to continuous agitation the pavement is compacted and the voids materially reduced. The machine also, it is stated, permits the use of a considerably drier mixture than it would be possible to use if the striking off, compacting and finishing were done by hand, thus producing a stronger concrete and a better finish.

The illustrations show the Lakewood concrete road finisher, as it is called, on the Belleville-Scott Field Road in St. Clair County, Illinois. The pavement is 15 ft. wide, 6 in. thick on the side and 7½ in. thick in the center, and consists of a 1:2:3½ mix. The road will be 6 mi. long when completed.

New Schramm Catalogue

"The Schramm Line" is the title of an attractive catalogue recently issued by Chris D. Schramm & Son, Inc., of Philadelphia, Pa.

It is designated as "general catalogue No. 18," and con-

sists of 80 pages and covers. The second and third pages carry descriptions of the Acme standard steel dump body and the Acme combination dump and stake body, giving complete dimensions. These pages also carry paragraphs describing the advantages of motor trucks for road work. The fourth page carries an illustration and the specifications of the Acme chassis.

Du Pont Advertising Division Moves

E. I. du Pont de Nemours & Co., of Wilmington, Del., has equipped an entire office building for the exclusive use of its advertising division.

Through the expansion of its business and the acquisition of allied industries the advertising division of the company has increased from a force of 11 people in 1911 to one of over 200. In addition the company has doubled its advertising appropriation for the present year instead of reducing advertising, and is planning a still further increase in 1919.

The advertising department is under the direction of George Frank Lord, Director of Advertising. The individual

companies making up the du Pont American industries and their advertising managers are as follows. The Arlington Works, A. R. Kneale; du Pont & Harrison Chemical Works, L. B. Steele; du Pont Fabrikoid Co., A. H. Berwald; du Pont Dye Works, S. F. Withe; Harrison & Bridgeport Paint

Works, J. Coleman Bentley; Industrial Explosives, E. F. Carley; Agricultural Explosives, F. W. Wilson; Sporting Powders, Edmynd Doremus. The Canadian advertising of the Arlington Co., Ltd., and the du Pont Fabrikoid Co., Ltd., both of Canada, is in charge of J. M. Cane.

MEETINGS

Calendar of Coming Meetings

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Michigan State Good Roads Association

The tenth annual convention of the Michigan State Good Roads Association will be held at Detroit, Mich., in connection with the State Fair on Tuesday, Wednesday and Thursday, Sept. 3, 4 and 5.

The first session will open at 9.30 a.m., Tuesday, Sept. 3. There will be morning and afternoon sessions each day. An evening session will be held on Wednesday, Sept. 4, at which moving pictures will be shown by the Barrett Co., the National Concrete Association, and the Barber Asphalt Paving Co.

Among the addresses scheduled for the various sessions are the following:

"Road Building in Michigan Under War Conditions," by

Frank F. Rogers, State Highway Commissioner; "The Development Bureau's Interest in Road Building," by John I. Gibson, Secretary of the Western Michigan Development Bureau; "Organization for Road Maintenance," by L. H. Neilsen, Maintenance Engineer, Michigan State Highway Department; "Covert Roads," by L. H. Belknap, Assessment District Engineer, Michigan State Highway Department; "Concrete Road Construction," by William W. Cox, Deputy State Highway Commissioner; "The Evolution of Michigan Roads," by N. P. Hull, Past Master, Michigan State Grange; "The Main Highway," by Arthur B. Williams, Battle Creek, Mich.; "The Kind of a Road I Would Build," by George H. Van Pelt, Charlevoix, Mich.; "Maintenance of Our Public Highways," by Governor Albert E. Sleeper of Michigan; "How We Did It in Wayne County," by Edward N. Hines, Chairman, Wayne County Highway Commission; "The Three A's," by A. G. Batchelder, American Automobile Association; "What the Detroit Automobile Club Stands For," by William E. Metzger, President, Detroit Automobile Club.

Reports from various county road commissioners will be received at the Tuesday afternoon session, and at 3 o'clock that afternoon an automobile inspection trip over Wayne County roads will be made. The annual address of the president will be given at the morning session on Thursday, at which time the committees will be appointed. The reports of the committees will be received at the afternoon session on Thursday.

PERSONAL MENTION

L. J. Ruddock, City Engineer of Wheaton, Ill., has been commissioned a captain in the Engineers' Reserve Corps.

W. A. Welch, Chief Engineer of the Palisades Interstate Park Commission, who was given a leave of absence to enter the Timber Department of the Air Service, has been promoted from captain to major. Maj. Welch has been acting as chief engineer of logging railways in the Northwest.

S. Fortin, of Ottawa, Ont., has been appointed Deputy Chief Engineer of Montreal to succeed Alex. Martin, resigned. Mr. Fortin, who was recently appointed deputy director of the Public Works Department, will take charge of the roads, sewers and surveying departments, his appointment taking effect on Sept. 1.

Henry W. Klausmann, City Civil Engineer of Indianapolis, Ind., died recently in that city. Mr. Klausmann has been engaged in engineering since 1891. From 1901 to 1910 he served for three terms as county surveyor of Marion County, and was city civil engineer of Indianapolis under the Shank administration. He was appointed again to that position on Jan. 7 of this year.

E. M. Vail, formerly a division engineer of the New Jersey State Highway Department, has been made division engineer in charge of the northern division, with headquarters at 790 Broad street, Newark.

Emlen S. Hare has been elected a vice president of the Packard Motor Car Co. He will retain his position as president of the Packard branch in New York, but will make his headquarters in Detroit.

A. L. Valentine has been appointed Seattle manager of the Coast Culvert & Flume Co., of Portland, Ore. Mr. Valentine was county engineer of King County, Washington, for four years, and later superintendent of the public utilities of Seattle.

Maintenance Work in Allegheny County, Pennsylvania, is proceeding satisfactorily, according to recent advices. The road commissioners have awarded 35 contracts covering the maintenance of about 75 mi. of road, and 15 of these, comprising about 25 mi., have been completed. Rapid progress is being made on the remainder. In addition the county is taking care of about 75 mi. of road with its own forces. Contracts for stone, screenings and asphalt amounting to about \$100,000 have recently been awarded.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, SEPTEMBER 7, 1918

Number
10

Labor Saving Plant on a Road Job in Macomb County, Michigan

Industrial Railway, Drag Line, Steam Shovel, and Other Equipment
Cut Hauling Cost and Save Men

A material handling plant that reduces hauling costs, saves waste and permits the use of a comparatively small labor force is the distinctive feature of a road job now under way in Macomb County, Michigan.

The work is being done in the construction of what is known as the Shore Road near Mt. Clemmens. The sec-

tion being improved is about $3\frac{1}{2}$ mi. long and is being paved with an 18-ft. asphalt pavement on a concrete base. The concrete base is being laid to a depth of 5 in., and will be covered with a 2-in. wearing surface. The concrete foundation is composed of one part of cement to six parts of lake gravel.



Drag Line and Gravel Pile Near Lake.



Loading Cars from Gravel Bins.



Unloading Gravel Box at Mixer.



Dumping Gravel Into Mixer Loader.

VIEWS OF CONTRACTOR'S PLANT ON LAKE SHORE ROAD, MACOMB COUNTY, MICHIGAN.

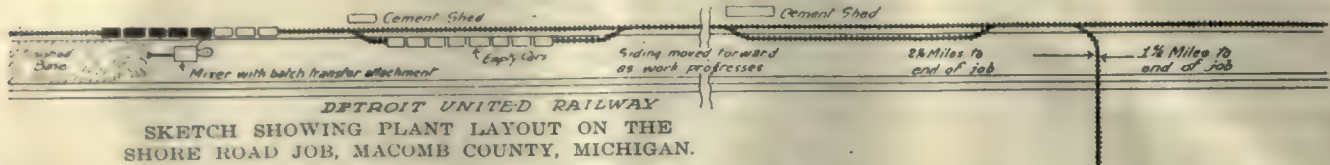
The plant used comprises a drag line, a steam shovel, an industrial railway, a concrete mixer, bins, cars and locomotive. The layout of the plant is shown in the illustration on this page.

The gravel is taken from a dredge at the lake shore by drag line and deposited in a pile from which it is loaded into bins by a steam shovel. The bins are built across a spur track of the industrial railway which runs the length of the job, and are of such a height that there is only 7 in.

The cement is stored in several sheds along the road as shown in the layout sketch. It is carried from the sheds to the mixer in the cars, each car holding 60 bags.

The concrete work was started about the middle of July, and at the time of this writing about 1½ mi. of concrete has been laid.

The track, switches, cars and mixer attachments were supplied by the Lakewood Engineering Co. of Cleveland, and the plant layout was suggested by that company's en-



between the top of the car and the bottom of the bin, thus preventing the material from flowing over the edges of the car if the gates are left open.

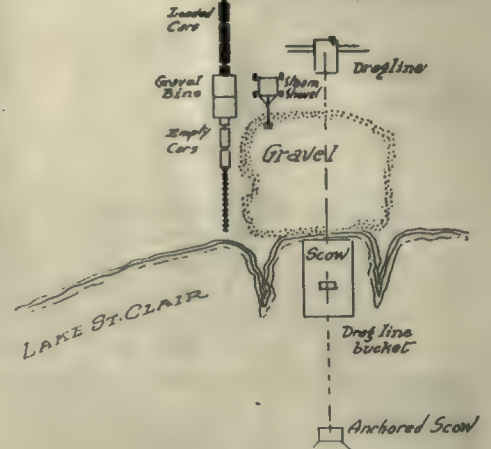
Eight-car trains carrying aggregate for 16 batches can be loaded by two men in from 6 to 8 minutes. Four cars are loaded at a time and are pulled by a team of horses up a slight grade to the first siding on the track along the job. The team then returns for a string of four more cars which are added to those previously hauled to the siding to make up a train. The loaded train is hauled to the mixer by a gasoline locomotive which brings back a string of empties at each trip.

The spur from the loading bins connects with the main line about midway between the east and west ends of the road.

Each car carries two boxes, each of which holds 20 cu. ft. of gravel. The mixer is equipped with a transfer attachment by means of which a box of gravel is lifted from the car and dumped into the loading hopper. Three bags of cement are then added to the gravel and the material deposited in the mixer. With this unloading arrangement only five men are needed at the loading end of the mixer, three to discharge a box of gravel into the hopper and two to handle the cement. Four men are required at the discharge end of the mixer as shown in one of the accompanying illustrations.

The tracks of the Detroit United Railway are located alongside the Shore Road and have to be crossed by the spur track leading to the gravel pile. The method of carrying the industrial track across the street car

About 1000 ft. haul from bins to main line construction track.



METHOD OF CARRYING INDUSTRIAL TRACK ACROSS STREET RAILWAY TRACK.



CONCRETE MIXER IN OPERATION, LAKE SHORE ROAD, NEAR MT. CLEMENS, MICH.

line is shown in one of the accompanying illustrations. Steel plates were bent at right angles and bolted to the bottom of the light rail and to the web of the heavy rail in such a manner as to bring the ends of the light rails 5 in. apart and 1½ in. above the top of the rail of the trolley track. This arrangement permits the flanges of the 12-in. wheels on the small car to just touch the top of the heavy rails and reduces the possibility of derailment.

The shovel used is an Erie and a Plymouth gasoline locomotive is used on the industrial railway.

The present rate of progress is about 400 ft. a day, while the best day's work up to this time is 512 ft. of finished base.

The contractor doing the work is Thomas E. Currie of Detroit.

Road Building in Michigan Under War Conditions

By FRANK F. ROGERS†

This country is at war and the patriotic duty of every good citizen is to uphold the Government and support in every way all movements which will help to shorten and eventually win the greatest and most barbarous war that ever cursed mankind. It is also the duty of every loyal citizen to arrange his business, either private or public, so as not to conflict with Government plans nor hinder the war industries.

That the State Highway Department is aware of this fact and that it is intensely loyal is evidenced by the service flag containing 33 stars which is displayed from this platform. An honor roll showing the names of the members in the service will be found with our exhibit in Machinery Hall. What this means can be appreciated more fully when I tell you that the greatest number of names ever on the department payroll was last month when we had a total of 111, 12 of whom were women. Last year the payroll numbered only about two-thirds of what it now does. Thus you see one-third as many as our present male force and one-half the number of the total force one year ago are now in the army and I am pleased to say that we have our share of captains, lieutenants and other minor officers.

I wish to say further that every drive for the Red Cross, for bonds, war saving stamps and smileage books, has met with a most liberal response from the individual members of the department.

Whether the State of Michigan should continue to build roads as in the past, should materially curtail road building operations, or practically cease building roads during the war period, are questions that were earnestly considered at the beginning of the year. A few letters were received, less than one-half dozen, advising that road building should be materially reduced in the interest of saving labor for the farms. However, many more were received urging that road building continue to as great an extent as possible, particularly on the main lines of travel.

In answer to a letter addressed to Hon. W. G. McAdoo, Director General of Railroads, Mr. G. W. Kirtley, Assistant Director, replied in part as follows:

"The policy of the Railroad Administration is to furnish equipment to the fullest extent (for the transportation of road materials) particularly in the direction of the normal empty movement of cars returning to the coal mines, after protecting the movement of material incident to the war."

Writing to the Missouri State Highway Department, Secretary of War Baker said:

"The construction of such roads will undoubtedly be of very great value to the community and incidentally to the state and nation, and in my opinion should receive proper encouragement."

Writing to the same department, Mr. Hoover said:

"Speeding up construction on good roads is an integral part of the Government war work; efficient transportation is necessary to reduce margin between producer and consumer."

This is sufficient to show the attitude of Government officials, until recently, toward road building in war times, and I wish to add that the policy of the Michigan State Highway Department has been to encourage road building

on the main trunk lines connecting important towns, even though the materials entering into their construction had to be transported by rail, and not to discourage the building of local roads where materials are so close at hand that they do not require rail transportation. But now the policy of the Government has changed and after Sept. 10, 1918, all roads into which enter manufactured products or for which materials have to be transported by water or rail, must be approved by the United States Highways Council, for, from that date on, no manufacturer will be allowed to furnish road materials and no railroad will be allowed to transport these materials unless a certificate of approval from the Government is shown.

The policy of the United States Highways Council is very clearly defined in Bulletin No. 1, extracts from which have been mailed to all the county road commissions of Michigan by the State Highway Department.

Work of Past Two Years

War-time prices for both materials and labor have increased enormously and that fact alone is responsible for reducing the state reward roads built by the townships and counties of Michigan from 1,053 mi. in 1917 to 793 mi. in 1918, a loss of about 25%. This is in spite of the fact that there never was so much available money for road building purposes. The figures for 1918 road taxes in Michigan are not yet available, but in 1917 the state, county and township road taxes amounted to a total of \$10,121,068. In addition to the above the state collected from automobiles \$2,471,270, of which \$1,272,246.66 was credited to the state highway fund for state rewards and other state highway purposes, while \$1,199,024.11 was returned to the counties where it has to be used for the building and maintenance of roads. Thus a grand total of \$12,592,338.77 was available for road building in Michigan last year over and above the money raised by bond issues from townships and counties and the money expended from the state war fund on the Selfridge Aviation Camp road, the Harmonia-Augusta and Upton Avenue Roads leading to Camp Custer, the Dixie detour and the present Dixie Highway now under construction in Monroe County; also special taxes raised under the Covert Act.

As most of you know, Michigan has something over 70,000 mi. of public wagon roads, exclusive of streets in villages and cities, 4,785.7 mi. of which compose the so-called state trunk line roads established by action of the Legislature. Up to the close of the present fiscal year, June 30, 1918, there had been filed with the State Highway Commissioner for state reward, applications covering 8,987 mi. of road, of which 5,786 mi. have been completed, accepted and state reward paid, amounting to \$5,719,059, an average of \$1,000 a mile. Of the above, 793 mi. were built during the last fiscal year, on which \$1,190,527 of state reward, single and trunk line, were paid. This is an average of a little over \$1,500 a mile, showing the benefit of increased state aid given by the last Legislature and the further fact that a large per cent. of the road building has been on the trunk lines and entitled to double reward. At present 25% of the entire trunk line system above referred to has been completed and 52 1/3% has been placed under application for state reward.

The road building activities of the State Highway Department during 1918 were greatly increased over the work in the past due to the work under both the federal aid and the so-called Covert or Road Assessment Act.

* Paper presented at the tenth annual convention of the Michigan State Good Roads Association, Detroit, Mich., Sept. 3-5, 1918.

† State Highway Commissioner of Michigan.

Federal Aid Roads

In 1916 the first federal aid act was passed by Congress and was followed by the Michigan state federal aid act passed by the Legislature of 1917, actual construction under which did not get started until the present year. The federal aid act, as is now well known, made an appropriation of \$75,000,000 covering a period of five years which is divided among the several states, one-third according to area, one-third according to population and one-third according to post road mileage. Michigan's share of this money during the five year period will be approximately \$2,180,000. The first three allotments, which have already been made, gave Michigan \$872,707.53. Up to the present, 20 federal aid projects have been approved by the Government, 1 is now pending and 19, covering 146 mi., have already been put under contract and are now under construction. These projects will take more than the entire three years' allotment above referred to, but we will soon be ready to make applications for projects under the fourth allotment which will allow approximately \$580,000 of federal money.

The state federal aid act makes six classes of counties, rating them according to their valuation per trunk line mile. According to the present state equalized valuations the six groups of counties with their federal aid ratings are as follows.

(1) Below \$100,000.—State 25% and county 25%: Alcona, Alger, Baraga, Clare, Crawford, Iosco, Kalkaska, Lake, Luce, Mackinac, Missaukee, Montmorency, Ogemaw, Ontonagon, Oscoda, Otsego, Presque Isle, Roscommon, Schoolcraft. This group of 19 counties has a valuation so small that they actually pay less than 3% of the state's taxes.

(2) From \$100,000 to \$200,000.—State 20% and county 30%: Antrim, Arenac, Benzie, Cheboygan, Chippewa, Delta, Dickinson, Gladwin, Leelanau, Menominee, Newaygo, Osceola.

(3) From \$200,000 to \$300,000.—State 15% and county 35%: Alpena, Charlevoix, Emmet, Iron, Manistee, Mason, Mecosta, Midland, Oceana, Wexford.

(4) From \$300,000 to \$400,000.—State 10% and county 40%: Grand Traverse, Isabella, Lapeer, Livingston, Marquette, Montcalm, Sanilac, Tuscola.

(5) From \$400,000 to \$500,000.—State 5% and county 45%: Allegan, Barry, Cass, Gogebic, Huron, Keweenaw, Van Buren.

(6) Above \$500,000.—State nothing and county 50%: Bay, Berrien, Branch, Calhoun, Clinton, Eaton, Genesee, Gratiot, Hillsdale, Houghton, Ionia, Ingham, Jackson, Kalamazoo, Kent, Lenawee, Macomb, Monroe, Muskegon, Oakland, Otsego, Saginaw, Shiawassee, St. Clair, St. Joseph, Washtenaw, Wayne. This group of 27 counties has a combined valuation so great that they pay more than three-fourths of the state's taxes.

Townships and good roads districts pay a percentage in accordance with the above schedule which is determined by dividing the assessed valuation of the township or good roads district by its allotted trunk line mileage plus any federal aid roads which may be allowed.

In one or two instances townships have been found which by bonding to the legal limit were unable to pay their apportionment of the cost of the proposed federal aid roads; hence I am of the opinion that there should be an additional rating below \$50,000 per trunk line mile where the required amount from the county or township would not exceed 10%.

The total cost of the 19 federal aid roads now under construction amounts to \$1,570,739.26. While the total allotment of federal aid amounting to nearly two and one-fourth millions seems large in the aggregate, at current prices, considering the types of roads built, it is very certain that this amount will build or aid in building less than 400 mi. of road which is doubtless less than one-tenth of the total roads that will be improved during the five year period covered

by federal aid. To illustrate further: The 146 mi. of federal aid roads now under contract will receive, on the average, a little over \$6,000 per mi. of federal money. If current prices continue we cannot hope for more than 360 mi. with the total federal appropriation. If prices go higher or the average type of roads is of a higher class, the total mileage will be less.

Covert Roads

The Legislature of 1915 passed the so-called Covert or Assessment District Road Act. This act provides for initiating roads on petition signed by enough property owners to represent upwards of 60% of the frontage. The road petitioned for must be at least 2 mi. in length unless required to fill in gaps between ends of roads previously built for state reward.

Since this act will be more fully described by Mr. L. H. Belknap, Engineer in Charge of Construction of Assessment District Roads for the Michigan State Highway Department, I will not go into details. However, I should state that at present petitions covering more than 1,200 mi. of road are on file with the department and contracts have been let covering 207 mi. at a total cost of nearly \$2,000,000 or to be exact \$1,823,933.22. This, added to the work that many counties are doing under the Covert Act, would doubtless bring the cost of this class of road under construction up to \$4,000,000, and perhaps more.

In addition to the federal aid roads and Covert roads under construction by the State Highway Department, it has under contract 20 bridges representing a total contract price of \$256,000 and has had under contract during the year \$460,000 worth of trunk line bridges.

From the foregoing it will be noted that the State Highway Department, even in war times, and with a handicap of shifting forces due to war conditions, has under construction over \$4,000,000 worth of roads and bridges in addition to the work of inspecting roads which are built for state reward by the townships and counties of Michigan which in the aggregate will cost considerably more than those built by the state. In fact, it would be a safe estimate to say that the State Highway Department has under its direct supervision and inspection road and bridge work approximating a total cost of more than \$10,000,000.

Military Roads

Last year the department built a road to the Selfridge Aviation Field, 2.35 mi. in length, of 20-ft. concrete at a total cost of \$86,500; one to Camp Custer via Harmonia Road, 2.9 mi. in length, costing \$79,845; one started to Camp Custer on the Augusta-Harmonia Road, 1.28 mi. in length, which was finished this year at a total cost of about \$25,000. This year the Upton Avenue Road, so-called, is also being built from Battle Creek to Camp Custer, which is 2.8 mi. in length and will cost, when completed, approximately \$80,000. The state is also completing the so-called Dixie Highway across Monroe County on account of the default of both the contractor and bonding company, which road, when completed, will be about 14 mi. in length and will represent a total cost, including bridges, of not less than \$375,000.

Last winter the department built a detour, some 11 mi. in length, around the Dixie Highway. This was temporary construction and consisted of merely placing crushed stone on an ungraded and undrained road surface over the flat clay loamy soil of Monroe County. This road served its purpose, namely of bridging over the traffic during the spring months when the frost was going out of the ground and when it was necessary to continually move war trucks and ambulances and other war freight over the country roads due to congested railway conditions. Later this road became very rough and almost impassable, but has now been

(Continued on page 92.)

GOOD ROADS

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

September 7, 1918

CURTAILING PASSENGER AUTOMOBILE PRODUCTION

The stopping of the production of passenger automobile manufacture after the end of this year, if actually carried out, will have a far-reaching effect upon the commercial, industrial and social life of the country, though it is impossible to foretell even approximately the nature of that effect.

The passenger car occupies a big place in American life. The term "pleasure car," by which until lately it was generally designated, probably accurately described its function for a long time. Latterly, however, it has become less and less a pleasure vehicle, and the present designation, "passenger car," is now the most truly descriptive name that could be applied. The term differentiates it from the freight automobile, or truck, and implies a serious, useful employment that in the majority of cases is nearer the truth than the former appellation.

There is a great deal of driving for pleasure and there always will be. There is a great deal of driving that is strictly for business. There is also a great deal that is for both business and pleasure—or, perhaps more correctly, that cannot be classed definitely as either.

When used wholly or partly for business the automobile is a means making for a great increase in efficiency. Many

workers have need to go from place to place, often to and fro between widely separated places. The automobile makes it possible to do this with the minimum of lost time, and to people so situated the motor car is well-nigh indispensable. Its value as a time-saver is almost unlimited, in fact.

There are probably enough passenger cars in the country so that if they could all be put at useful work business would not suffer greatly, but all of them cannot—at least will not—be converted to such use.

If no permanent restrictions are put upon the use of gasoline for pleasure travel—or "joy riding"—passenger automobile traffic will be neither increased nor decreased to an appreciable extent by the cessation of car production, and the proportions of pleasure and business traffic will remain about as at present.

If, on the other hand, it becomes necessary materially to reduce gasoline consumption for pleasure the amount of motor traffic will naturally become less, and the ratio of business traffic to total traffic will become greater.

The road builder's interest in the motor-driven vehicle primarily centers around its effects upon the highways. Both trucks and pleasure cars wear out roads, and the road builder's job is to build new roads that will carry motor traffic and to take care of the wear and tear on existing roads. Taking care of truck traffic is so much more difficult than providing for passenger car traffic that a halt in the increase of the latter will not materially affect the road builder's work, hence he can have very little professional interest in steps taken to curtail passenger car production.

The real sufferers will be the people who depend upon the automobile for the efficient conduct of their daily work. Some plan whereby they can be taken care of should be evolved, even at the expense of the car owner who uses his automobile merely for pleasure.

SAVING LABOR BY THE EMPLOYMENT OF MACHINERY

Progressive, up-to-date contractors in every line of work have always been quick to take advantage of machinery to reduce costs of construction. In road work elaborate plants have not been used as much as in some other work, for road building, in the past, especially at the beginning of the present era of activity, consisted chiefly of small jobs scattered over a very large area. But as the amount of work increased, the individual jobs became larger and more costly and plant gradually assumed more importance. With the labor shortage consequent upon the war, road builders have been forced to turn to machinery and it seems reasonable to expect that the results achieved will lead to a constantly increasing use after the war.

A good example of the effective use of plant is presented in a description of work in Macomb County, Michigan, printed in this issue. By means of an industrial railway and other equipment a very large reduction is being effected in the cost of handling materials—nearly always a large item in road building operations. The use of the railway is especially noteworthy in view of the fact that the maximum haul is only about two miles.

The variety of equipment that can be used in highway work is very large and is constantly growing larger. In fact, there are few kinds of work in which it is possible to utilize more different kinds. The days when a crusher, dump carts, possibly a roller, and hand tools were all that were thought necessary are over. Modern traffic requires modern roads and the building of modern roads calls for the use of modern equipment.

Road Building in Michigan Under War Conditions

(Continued from page 90.)

smoothed down and will serve as a local road after the completion of the Dixie Highway about two months hence.

The activities of the State Highway Department during the past year have been very largely devoted to closing in the gaps still existing in the main roads of the state and doubtless the limited amount of work which the Government will permit during the remainder of the war period will also be directed toward the same end.

Portland Cement Prices

War Industries Board Fixes Prices and Conditions of Government Purchase at Various Points

The following statement relative to fixing of prices for Portland cement and the conditions under which it may be purchased has been authorized by the War Industries Board:

After meeting the War Service Committee of the industry on Aug. 23 the price fixing committee of the War Industries Board has fixed the following basis of prices for Portland cement, f. o. b. at the locations named, for Government purchases, effective for the four months ending Dec. 31, 1918:

	Per bbl.
Hudson, N. Y.	\$1.82
Northampton, Pa.	1.72
Universal, Pa.	1.72
Fordwick, Va.	1.67
Bellevue, Mich.	1.77
Mitchell, Ind.	1.67
Hannibal, Mo.	1.67
Buffington, Ind.	1.67
La Salle, Ill.	1.67
Mason City, Ia.	1.67
Iola, Kan.	1.72
Steeleton, Minn.	1.67
Kingsport, Tenn.	1.62
Richard City, Tenn.	1.62
Harrys, Tex.	1.67
Houston, Tex.	1.77
El Paso, Tex.	1.92
San Antonio, Tex.	1.92
Trident, Mont.	1.87
Portland, Colo.	1.72
Devils Slide, Utah.	1.87
Brigham, Utah.	1.87
Salt Lake City, Utah.	1.87
Irvin, Wash.	1.92
Concrete, Wash.	1.92
Oawego, Ore.	1.97
Cement, Cal.	1.92
Davenport, Cal.	1.92
Crestmore, Cal.	1.92

Shipments in bulk 5 ct. per bbl. less.

Shipments in paper bags 30 ct. per bbl. additional.

Shipments in cloth bags \$1 per bbl. additional.

Cement companies will issue credit to the department or contractor to whom the cement has been sold or shipped in cloth bags at the rate of 25 ct. each for the company's empty cloth bags bearing its brand upon receipt in serviceable condition at its mill, freight prepaid, subject to the company's inspection and count, such bags to be returned within 60 days from date of receipt of shipment. The cloth bags are the property of the cement companies and are not to be used by the Government departments or their contractors for other purposes, and while in their possession are to be properly cared for and special attention given to their prompt return to the shipping mill.

The above does not cover shipments in wooden barrels or paper-lined cloth bags, which special forms of packages are rarely required. When shipments in such packages are desired prices based upon their cost will be determined at the time the order is placed.

Where bin storage is required for cement held for the 7 or 28 day test there will be an additional charge of 3 ct. per bbl. Where cement is not held in bins to await the result of the 7-day test there will be no charge for bin storage.

On the above basis, with freight added, prices will be

named f. o. b. cars at destination, based upon present rates of freight, subject to increase in destination prices in accordance with any increase which may be made in freight rates. The freight charges are to be paid by the purchaser and shipments must be consigned to a Government officer, or, if consigned to other than a Government officer, must be accompanied by a certificate (form 750) signed by a Government officer, stating that the cement is for Government use and that any saving will accrue to the benefit of the Government, otherwise the purchaser must also pay the war tax on the freight charges. Shipments are to be made freight collect, and for convenience in billing invoices will be rendered on the basis of the above named prices, plus the current freight rate. In payment of the account the freight charges paid by the Government departments or their contractors will be deducted from the total amount of the invoices. When shipments are required freight prepaid form 750, furnished by the Commissioner of Internal Revenue, must be signed by the officer in charge of the work in question and forwarded to the shipping company with the order, who will file this certificate with the railroad company at the time the first shipment is made on this order.

Terms of payment will be net cash within 30 days from date of receipt of shipment.

Attached are the conditions under which the purchases of Portland cement are to be made by the several departments of the Government at the above named prices for the four-month period ending Dec. 31, 1918:

1.—All cement must meet the requirements of the United States Government specifications for Portland cement. (Note Circular No. 33.)

2.—The cement will be generally shipped on 7-day test unless specifically waived, but this does not waive the full requirements of the specifications, including 28-day tests, and any waiver will be handled direct by the department concerned.

3.—All shipments must be from 7-day accepted cement unless otherwise provided by the purchasing officer, but no cement shall be shipped that has not passed the tests for fineness, soundness and time of setting.

4.—At the discretion of the purchasing officer any company whose cement has failed to meet the Government tests may be denied further orders.

5.—The minimum shipment shall be one carload.

6.—Three bills of lading will be required.

7.—When shipments are required freight prepaid form 750, furnished by the Commissioner of Internal Revenue, must be signed by the officer in charge of the work in question and forwarded to the shipping company with the order, who will file this certificate with the railroad company at the time the first shipment is made on this order.

8.—To secure the Government price orders must be either placed directly by the Government officer or the order must be certified as for Government use by the department concerned, stating that the saving in the Government price over the commercial price will accrue to the benefit of the Government.

9.—All orders must bear the requisition number, contract number, number of barrels required, when required, rate of shipment, definite shipping point, name of purchaser and to whom consigned, and name of contractor.

10.—The allotted time for the return of the bags shall be 60 days from the date of delivery of the shipment.

11.—Unless otherwise directed the cement shall be billed direct to the Government officer in charge.

12.—All orders for cement to be purchased at Government price must be placed through the War Service Committee on Portland cement.

Maintaining Roads for the Training of Military Truck Drivers

Unusual Problem Encountered by the Iowa State College Where the Government Is Training Drivers of Motor Trucks

The officials of the Iowa State College are confronted with a rather unique problem in road maintenance, according to a recent article in the "Service Bulletin" of the State Highway Commission. The work is the keeping up of the roads on the college campus used by the Government for the training of motor truck drivers.

So far, two contingents of 500 men each have been trained and a third set of 500 now in training will complete their work about Oct. 15. The training period is eight weeks, and besides military drill and instruction and practice in repair work and the care of their machines, the men are given a stiff course in operation. The roads on the college campus and other roads in the vicinity of the college are used for this purpose.

The roads on the campus, with the exception of about $\frac{1}{4}$ mi. of concrete paving, are of earth with cinder surfacing, and naturally deteriorate very rapidly under the wheels of the heavy army trucks.

In keeping them in condition, the roads are shaped up with a light blade grader drawn by a gasoline roller which compacts the roadbed at the same time. Heavy road oil is then applied, the college having been permitted to secure the material because of the use to which the roads are put. It is stated that during wet periods the roads stand up fairly well, but that long dry periods make the job of maintenance a difficult one and one that must be continuous.

Federal Highway Department Urged Governor Edge of New Jersey Calls Attention to the Need of Highway Improvement Under Federal Control

A federal road department is one of the pressing needs of the time, according to Governor Edge of New Jersey. This measure was urged by the governor at a meeting of Sussex County farmers, where he spoke in part as follows:

"Food prices had been growing rapidly intolerable for years prior to the war. The latter may have aggravated the situation, but did not cause it. It is due to unscientific and unbusiness-like relationship between our farms and our markets. Farmers are ready and willing to assist in a solution of the problem, and they are hit just like any other consumer. The cost of raising cattle, for instance, has increased so greatly on account of mounting prices of feed during the past year or so that New Jersey, although greatly increasing the acreage of other farm products under war pressure, actually raised less cattle in 1917 than in 1915.

"Every one is familiar with the manner in which the motor engine has revolutionized farming. But for this industry the farm labor and food shortage problems would be infinitely more acute than they are. Make the motor engine revolutionize the distribution of farm products; make it do so by cooperating with the development of the commercial auto industry and building modern highways. Individual states like New Jersey and New York have realized the value of good road investment and taken the initiative so far as their particular territory is concerned, but this is not sufficient. Crop acreage and food prices are dependent in very many cases upon the market situation and distribution facilities, which are not merely state-wide, but country-wide.

"New Jersey, New York and Pennsylvania had this very fact in mind when they began serious negotiations for tunneling the Hudson and bridging the Delaware for traffic purposes, thus seeking to connect up the highway arteries

of the three commonwealths into this one great unified system, touching the vital sources of supply and demand in a large and busy territory of the country. The Federal Government is even in a better position than any state or combination of states to assume a directing generalship over the highways of the whole nation, supplying the missing links here and there and directing new extension in such a way that available undeveloped land will be opened up to the touch of agriculture and the nation's enormous aggregate expenditure on roads will be divested of that wanton waste which is the product of gross mismanagement and selfish motives.

"There has been much discussion concerning the cost of the New Jersey highway system, but I am sure every fair-minded man will agree that no one can be held responsible for the increased cost of construction. Highways are practically in the same class as food. We must have food, and it does not matter if it costs ten times what it formerly did. We likewise must maintain our highways in order to keep up the business responsibility of the state, whatever the costs."

Pennsylvania State Highway Work Statement by Commissioner O'Neil Showing Present Status of Contracts

State Highway Commissioner J. Denny O'Neil of Pennsylvania has recently issued a statement showing the number of miles of road construction and the improvements now under contract.

According to Commissioner O'Neil there are now under contract 69 road improvement projects, involving contract prices amounting to \$5,407,678.77. These projects are situated in 33 counties and have a total length of 150.52 mi.

The character of work covered by the 69 contracts is as follows: Plain and reinforced concrete, 42; brick on concrete base, 17; grading and drainage only, 4; water-bound macadam, 2; bituminous macadam, 1; asphalt block, 1.

On account of local contributions and federal aid money the net cost to the state will amount to \$3,050,749.76. The total amount to be paid by the Federal Government is \$567,360, and the local contributions are as follows:

Amount from local authorities on the "fifty-fifty" basis of improving state highway routes.....	\$1,599,152.81
Voluntary contributions from local sources.....	116,372.48
Amounts paid on the state aid basis from counties, townships, etc.	74,043.72
Total amount from local sources.....	\$1,789,569.01

"Practically all of the above projects," according to Commissioner O'Neil's statement, "are main links in the state highway system and many connect county seats and important industrial centers. Some are important sections of the Lincoln Highway, the National Pike, the Pittsburgh Pike, and the sections of road in Erie County eventually will aid in linking up the road systems of Ohio, Pennsylvania and New York.

"While the State Highway Department deems all of these roads important, it is working in the fullest harmony with the Government, and schedules of all of the above projects have been submitted to the authorities at Washington for their consideration.

"In case they should deem it wise to suspend operations on account of the war all of the above roads will be placed in the best possible condition so that they can be used during the interim.

"The subject of maintenance is one that the Government, as well as the State Highway Department, will give careful consideration, as it would be false economy to allow the roads that already have been constructed to deteriorate. In order to expedite transportation the State Highway Department will utilize local materials wherever available and will do all maintenance work with regular help."

Road Maintenance in Iowa

Patrol System Adopted by 52 of the 99 Counties of the State

According to an article in a recent issue of the "Service Bulletin" of the Iowa State Highway Commission, 52 of the 99 counties of Iowa have divided their road systems into districts with patrolmen in charge.

The law of the state makes the establishment of the patrol system compulsory, but although it has been in effect for two years only a little over one-half of the counties have complied. The chief hindrances to the extension of the system, it is stated, are the inability to secure men and the cost.

The number of patrolmen in each county varies from 2 to 15, and the length of road patrolled from 30 to 184 mi. The average length of road patrolled in the counties which have adopted this system is nearly 150 mi.

Harvest Likely to Delay North Dakota Road Work

Maintenance by Patrol System Favored by the State Highway Commission

Because of the scarcity of labor and the immediate need for all available men in the harvest fields some of the road contracts under way in North Dakota are likely to run over into next season, according to a report from that state.

At present 200 mi. of state and federal highway are under construction, and almost \$1,000,000 is to be expended for such work now under way or contemplated for this year and next. Federal aid work now under contract calls for an expenditure of \$172,799.18.

The state highway authorities are at present devoting considerable attention to the completion of plans for the maintenance of roads improved by state or federal aid. It is expected that the patrol system will finally be adopted.

Highway Transport Committees Vital to the Nation's Defense

Statement Authorized by Parent Body Explains Services Rendered

The following statement is authorized by the Highways Transport Committee of the Council of National Defense:

The practically unanimous enactment by Congress of the new draft measure, coupled with the nation-wide movement of the United States Employment Service in surveying the potential man power of the country—both of these pointing unerringly to the supreme demand of the hour, man power to the nation's limit—have driven home the vital character of the activities supplementing these calls upon the country's resources, among which are those being daily brought into motion by the Highways Transport Committee, Council of National Defense.

This problem, which is a local one in every state in the Union down even to the smallest of the political subdivisions, is being met by the highways transport bodies through the efforts, for instance, of a rural motor truck operator in Colorado, who reports that he is daily saving through one route the services of 50 men on the farms at the expense of but 3 men in the operation of his truck.

This spells increased man power that food production may be made certain, just as the operation of a return loads bureau in Pennsylvania, that rail congestion be relieved, means coal for the navy to bunker the ships, and so an increased transport service for the army in the moving of munitions of war for use by the men in France.

The highways transport committees in their work are thus

carrying out the views recently outlined by the President in emphasizing "the value of extending our defense organization into the smallest communities." The President's view characterizes as "truly democratic" this system of bringing together the individuals of the country into movement looking to the furthering of the dynamic force which is carrying the nation forward to victory.

The gravity of the situation and the potential aid of which the Highways Transport Committee is capable in relieving freight congestion is recognized by Major General George W. Goethals, Assistant Chief of Staff, United States Army, in a letter to the state highways transport committees in which he points particularly to the aid being given by such committees in helping to increase the nation's transportation facilities by the development of efficient and effective highways transportation. Continuing, General Goethals says the work of the committee "is of great value in that it tends to result in speeding up the delivery of munitions and other army supplies which might otherwise be delayed through terminal congestion during this war time."

That the truly national viewpoint is being kept in mind by these workers in the cause of the most efficient use possible of all highways transport is strongly indicated by reports received from them by national headquarters. This non-sectional spirit, which permits the highways transport worker in Utah or Texas or Alabama, for instance, to sense the crucial situation certain to be reached in states east of the Mississippi as fall and winter draw near, emphasizes the determination back of all these truly American war workers to prosecute their particular activity in such way as to aid most materially those results sought to be accomplished by the war.

The demand for conservation of all resources is increasing so tremendously even now in the extreme East and in some of the other sections east of the Mississippi, that the Fuel Administration has been forced to place a supply limit of days on the bituminous coal which industrial plants may store. The priorities division of the War Industries Board is daily curtailing the use of materials going into manufactures with the sole object in view of restricting rail transportation and conserving the materials needed in the production of war essentials.

Further force has been given to recognition of the aims and policies of the highways transport committees along food conservation lines by Herbert Hoover, United States Food Administrator, who, following his recent return from a survey of food conditions abroad, strongly emphasizes his previously expressed views as to importance of all efficiency possible in the transportation of foodstuffs.

Mr. Hoover sees as direct beneficiaries of the efficient use of highways transport of every character the following:

First, the producer, the consumer and the railroad; second, facilitation of delivery, conservation of labor, and conservation of foodstuffs.

Also, it has been decided that it will be necessary to limit the amount of coal storage that industrial plants will be allowed to accumulate and to carry on hand and to fix a uniform amount for each state.

In strongly supplementing these vital war aims, the functions of the highways transport committees of all the states again come into play.

A 40-mi. Concrete Highway Across Eastland County, Texas, is one of the projects to be undertaken in the development of the oil field in that locality. It is reported that the road will cost \$16,000 a mile, and will be built from the proceeds of a \$500,000 bond issue, together with funds which it is hoped to obtain from the state and from the Federal Government. The road will cross the county, passing through the towns of Ranger, Eastland and Cisco.

MOTOR VEHICLE TRANSPORTATION

Shipment of Class B Trucks

War Department Reports Large Shipments of This Type of Vehicle to the Other Side

The production of class B motor trucks, according to a recent statement authorized by the War Department, has reached a stage where the Motor Transport Service of the Quartermaster Corps is producing and shipping overseas a steady stream of these machines.

A class B truck is a standardized machine of from 3 to 5 tons capacity, and the first five were completed on Jan. 8 of this year. The production, as of Aug. 17, was as follows: Shipped, 3,174, completed and approved, 2,404, completed but not inspected, 747, under construction, 637.

Manufacture of Passenger Automobiles

Statement Authorized by the War Industries Board Announcing Curtailment During Remainder of This Year and Stating Its Position on 1919 Production

As noted in "Good Roads" for Aug. 17, the War Industries Board recently advised automobile manufacturers to discontinue the manufacture of passenger cars by Jan. 1, 1919, and put their business on a 100% war basis. On Aug. 10 a meeting of the War Industries Board and representatives of the National Automobile Dealers' Association was held in Washington, following which a statement covering the facts developed at that meeting was issued by the board. This was noted in "Good Roads" for Aug. 24. The following authorized statement, dated August 26, covers the subsequent negotiations between the board and the manufacturers:

Bernard M. Baruch, chairman, and representatives of various divisions of the War Industries Board, reached yesterday a satisfactory conclusion of their negotiations with representatives of the automobile industry, concerning the curtailment to be effected in the production of passenger automobiles.

The meetings in which the agreement was reached were characterized by complete harmony, Messrs. Hugh Chalmers and Albert Reeves representing the industry, accepting without hesitation or reservation the cut suggested as one imperatively required by the demands of the Government's program, particularly for steel, iron, coal and labor.

The agreement was expressed in a letter addressed to the National Automobile Chamber of Commerce and signed by Alexander Legge, vice chairman; Edwin B. Parker, priorities commissioner; J. L. Replogle, director of steel supply, and George N. Peek, commissioner of finished products, of the War Industries Board, who served as a committee with full powers to act for the board in the automobile negotiations.

In effect the agreement provides that no manufacturer of passenger automobiles shall produce in the second half of this year more than 25% of the number of cars produced by him in the entire year 1917. To effect this production the War Industries Board will extend preference treatment to automobile manufacturers in the matter of obtaining the materials they require to "match up" the stocks now in hand, upon condition that the manufacturers subscribe to the pledges required by the priorities division of the board. There is a further condition that, in evening up their stocks and completing the cars now in process of manufacture, plants that have an excess supply of steel shall turn over to

other plants that can use it such steel as may be required to complete their production and is not needed for war work.

Concerning the production of passenger automobiles after Dec. 31, 1918, the representatives of the board were able to make no promises. Because of the great requirements for iron, steel and coal in the war program the members of the committee again urged the members of the automobile industry to make all possible haste in converting their plants so that they may be used for direct or indirect war work.

The investment in the industry in 1917 was roundly more than a billion dollars. It was the feeling of the board that an industry of this magnitude demanded all the assistance that could be legitimately given in enabling it to clean up its stocks, and the representatives of the industry expressed their willingness to place themselves on the same basis of business sacrifice that is demanded of other industries in this period when the needs of the Government precede all others.

Following is the full text of the letter:

National Automobile Chamber of Commerce,
7 E. 42nd St.,
New York City.

Gentlemen:

Supplementing our letter to you of the 9th inst., we beg to advise that we have now received most of the reports embodying the data and information which we requested you to furnish us and have given these reports careful study and consideration. From them it appears that the stocks of raw materials and of semi-finished materials in the hands of the manufacturers of passenger automobiles, while large, are greatly unbalanced, with the result that these large stocks, aggregating approximately \$150,000,000, cannot be liquidated until they have been "matched up" with other materials necessary to manufacture the completed cars.

The conclusion has been reached that it is in the public interest, as well as in the interest of your industry, that it be assisted as far as practicable, without interfering with the war program, in the liquidation of its stocks now on hand, and to that end the priorities division of the War Industries Board will accord a degree of preference designed to accomplish this result to all manufacturers of passenger automobiles who will subscribe to a pledge to be prescribed by the priorities commissioner embodying in substance the following:

(1) That the manufacturer will limit its purchase of materials, equipment and supplies to such as are absolutely necessary to match up its stocks now on hand.

(2) That its production of passenger automobiles and all repair parts therefor, shall not for the six months ending with Dec. 31, 1918, exceed 25% of its production for the calendar year 1917.

(3) That it will conserve and economize in every possible way its stocks of iron and steel and their products now in its hands, or that may come into its possession, and will release on request of the War Industries Board to such other manufacturer of passenger automobile as may be designated by the said board, such of its stocks as can be utilized by such other manufacturer and which are not required by it for either the limited production above specified or for war work.

(4) That it will from time to time render such reports of its activities under oath or otherwise as may be called for by the War Industries Board.

The War Industries Board will, in carrying into effect the terms of the pledge herein provided for, use as a basis as far as applicable, the sworn reports recently rendered it in pursuance of its request.

In justice to the passenger automobile industry we feel again impelled, as the situation appears to us now, to frankly repeat our statement to you of Aug. 9, that the urgent war requirements for iron and steel are so great that the probability of your industry procuring iron and steel after Jan. 1, 1919, for the manufacture of passenger automobiles is so uncertain that we again urge the members of your industry to, as rapidly as possible, utilize your facilities for the production of direct and indirect war requirements, not only in the interest of the nation, but in the interest of your industry itself. In such effort the members of your industry will have the active and whole-hearted cooperation of this board.

MEETINGS

Calendar of Coming Meetings

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Dixie-Overland Highway Association

The annual meeting of the Dixie-Overland Highway Association was held at Shreveport, La., Aug. 15. The meeting was devoted principally to the reception of reports of officers of the organization and of officers of its various divisions.

Resolutions were adopted urging federal legislation providing that the Government construct or direct the construction of needed highways, and urging the utilization of alien enemies or other federal prisoners in road construction.

Officers for the coming year were elected as follows: President, Bert K. Smith, Fort Worth, Tex.; General Vice President, Sam Howard, Meridian, Miss.; Secretary, Leland J. Henderson.

State division vice presidents were elected as follows: D. M. Dixon, Georgia; M. M. Cassidy, Mississippi; Will Mercer, Louisiana; E. J. Hernan, Texas; Dr. S. M. Johnson, New Mexico; Ed Fletcher, California. The appointment of representatives from Arizona and Alabama was left to the executive committee.

PERSONAL MENTION

J. W. Paxton has resigned as Superintendent of Street Cleaning of Washington, D. C.

Thomas L. Costigan has been appointed superintendent of street cleaning, Washington, D. C., succeeding J. W. Paxton, resigned. Mr. Costigan was formerly principal assistant inspector in the Building Inspection Department of Washington.

William S. Moore, State Highway Engineer of Indiana, has been given a leave of absence by the State Highway Commission of that state, and has entered the employ of the Silveco Co., of Bethlehem, Pa., as efficiency engineer. As has been noted in these columns, the validity of the law creating the Indiana State Highway Commission has been questioned, and its work has been stopped pending a final decision.

Frank C. Lingenfelter has been appointed city civil engineer of Indianapolis, Ind., to succeed Henry W. Klausman, whose death was noted in "Good Roads" for Aug. 31. Mr. Lingenfelter entered the office of the city civil engineer of Indianapolis in 1907 and in 1918 was appointed principal assistant city civil engineer. Previous to entering the employ of the city he was in the contracting business and in the engineering department of the Big Four Railroad, and since his connection with the city he has specialized in track elevation work.

H. L. Tatnall has been appointed secretary and engineer of the Board of Park Commissioners of Wilmington, Del.

Elmo A. Funk, City Engineer of Anderson, Ind., has resigned and entered the engineering department of the Hill Pump Co. of Anderson, Ind.

R. T. McClelland, an engineer with the Blaw-Knox Co. of Pittsburgh, Pa., has been commissioned a first lieutenant in the Engineer Officers' Reserve Corps.

Roads in Camp Sevier, South Carolina, are to be improved at a cost of about \$150,000, according to recent advices. The work will include the construction of a pavement from the Paris station to the base hospital, and the extension of a concrete road through the camp, the two forming a continuous paved road from the remount depot at one end of the camp to the base hospital at the other. The proposed work also includes the improvement of a number of other roadways.

Essex County, New Jersey, is to receive \$180,000 as its portion of the state motor vehicle fund for road repairs and \$50,000 from the state appropriation for road construction during the first quarter of 1919, according to recent advices to the Board of Freeholders by the State Highway Commission. Both appropriations are conditioned upon the county's agreement that the State Highway Commission shall have the right to pass upon work which is partly paid for out of these funds.

A Uniform Marking System for Missouri Roads is advocated by the State Highway Department of that state. Under the present law the department has no authority to approve expenditures for placing signs on intercounty seat roads, although a uniform marking system for state roads is provided for in the Hawes road law. There are 11,300 mi. of intercounty seat roads in the state, and the appropriation for dragging and improving is sufficient to more than pay for well-made signs, and it is argued that the authority given in the Hawes law should be extended to cover the intercounty seat road system in the state.

An Increased Demand for Prison Labor in Missouri has been created by the scarcity of teams and local labor for road construction. The State Highway Department has utilized convict labor with success, but has been unable to obtain men for several projects because all available prisoners were at work in the industries operated at the state prison. Satisfactory results from prison labor have been obtained by laying out the work carefully, organizing the men into groups for specific work and supplying them with proper equipment. The convicts in honor camps, where they are worked without guards and without stripes, appreciate their opportunities, and, it is reported, in many cases become interested and efficient road builders.

A Serious Shortage of Motor Fuel in New Zealand is reported in a recent issue of the "Commerce Reports." The shortage extends to benzine, gasoline and other motor spirits and is said to be interfering, to some extent, with some of the industries of the country, especially dairying and farming. The wholesale price at important ports averages about \$5.72 per 10-gal. case, but the retail price in some parts of the country is double this amount. According to estimates there were about 10,500 motor vehicles in the country in 1914, while at the end of 1917 there were about 21,000. The imports of gasoline, benzine and other motor spirits in 1914 amounted to about 6,840,975 gal., while in 1917 only about 30% more was brought into the country.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, SEPTEMBER 14, 1918

Number
11

Provisions for Winter Highway Traffic

Work of Keeping Through Routes Clear of Snow Commenced Last Winter to Be Feature of Next Winter's State Highway Work.

Railroad congestion under the enormous increase of freight traffic last winter forced shippers to turn to the highway for relief, with the result that not a few roads ordinarily closed to travel during the winter months were kept open practically all winter. The conditions that brought about this departure from former ways seem likely to be duplicated—perhaps aggravated—during the winter to come, and efforts to keep truck traffic moving are to be made not only in those states where a start was made a year ago, but also in some others where the work is to be undertaken for the first time.

In the present crisis of the nation's affairs transportation is a vital part of the great task of winning the war. The day of victory must be hastened in every way possible and few single factors—if, indeed, any single factor—will have a greater influence than will the moving of goods for the soldiers overseas and the civilians at home.

The road builder's job is to keep the roads in the best possible condition to carry the heavy traffic they must carry in doing "their bit." This job consists chiefly of maintenance. Construction, reconstruction and repair are of

great importance, but maintenance comes first. In addition, the great arterial routes of the nation's highway system must be made 365-day roads; must be available in winter as well as summer. In a very large portion of the country that means that they must be cleared of snow.

Until last winter the problem of keeping highways open for winter travel had not been attacked seriously except in cities and in a comparatively few rural or semi-rural communities here and there. Because it is a new problem and one of the utmost importance to road builders "Good Roads" has made a canvass of the state highway departments of northern states to ascertain what plans have been made for the coming winter and has also made inquiry among manufacturers as to the available snow removal machinery.

The canvass indicates in general that a determined effort is to be made to keep the roads open in those states through and in which there is the greatest amount of war traffic. It also shows that while preparations for the work are being made, in most cases they have not yet been completed. Such information as is available at this time is therefore presented here and will be supplemented later.



STREET RAILWAY DERRICK CAR HAULING ROAD MACHINE IN SNOW REMOVAL IN NORTHERN NEW YORK—ROAD MACHINE IS A HEAVY GRADER MADE BY THE ACME ROAD MACHINERY CO.



HORSE-DRAWN ROTARY SNOW PLOW IN OPERATION IN THE CITY OF OUTREMENT, CANADA—MACHINE IS THE STADIG ROTARY SNOW PLOW MADE BY THE CANADIAN FAIRBANKS-MORSE CO.

Last winter's snow removal work was much more extensive than is generally realized and will serve in many states as the basis of plans for the coming season. It was naturally almost wholly confined to the northern states east of the Mississippi River, in which the snow-fall is the greatest and the war traffic was the heaviest. Extensive work was done along the routes of motor truck drive-aways from mid-western factories to the Atlantic seaboard and in the North Atlantic states, where the manufacture of munitions and other supplies created a greater freight traffic than the railroads could handle. During a considerable portion of the winter the drive-away route from Detroit to Baltimore was kept open by the cooperation of state highway officials,

land state line. The total distance is about 250 mi., and by means of a carefully worked out plan of operation it was kept open to traffic practically all winter. A complete description of the work was printed in these columns last winter. ("Removing Snow from Pennsylvania Highways," by George H. Biles, Second Deputy Commissioner, Pennsylvania State Highway Department, "Good Roads," Feb. 23, 1918, page 107.)

The work was entrusted to the Maintenance Division of the State Highway Department under the direction of Deputy Commissioner Biles, and was carried out by the regular forces and equipment of the division and such additions as were necessary. The division's regular force of 34



Flathead County, Montana—Improvised Plow Attached to a Federal Truck Owned by the County.



Buffalo, N. Y.—"Champlon" Plow, Made by the Good Roads Machinery Co., on a Pierce-Arrow Truck.



New York, N. Y.—A 1-Ton Truck Equipped with a Baker Auto Truck Plow, Made by the Baker Mfg. Co.



Boston Post Road in Connecticut—"Champlon" Plow Attached to a Riker Truck.

MOTOR TRUCKS EQUIPPED WITH SNOW PLOWS USED IN LAST WINTER'S WORK.

county and township authorities and state councils of defense in Michigan, Ohio, Pennsylvania and Maryland. New York, New Jersey and Connecticut also did much work, and all of these states, with a number of others, are planning even more effective measures for the winter of 1918-19.

The work in Pennsylvania was probably as extensive as that undertaken by any state highway department last winter, and the methods employed are of interest as typical of those likely to be followed in next winter's work.

The drive-away route previously referred to enters Pennsylvania at the west near Beaver Falls and passes through that city, Pittsburgh, Greensburg, Bedford, McConnellsburg, Chambersburg, Gettysburg and Littlestown to the Mary-

patrolmen on this section of road was used to observe conditions and make reports to headquarters. The mechanical equipment employed consisted of motor trucks equipped with snow plows, tractors, road machines and drags. This was distributed among the larger towns along the route, ready for use when and where needed. By means of the patrolmen's reports it was possible to rush men, teams and equipment to any section of the route.

When deep snow had to be removed teams and drags were used to break out the road. These were followed by road machines or trucks equipped with plows and then by shovelers. After the road had been opened to traffic turn-outs were made at intervals and the cleared portion then



"KING JUNIOR" GRADER, MADE BY J. D. ADAMS & CO., IN USE AT COLORADO SPRINGS, COLO.

widened to 14 or 16 ft. Eventually the entire width of the traveled portion of the roadway was cleared, chiefly to guard against the making of ruts during periods of freezing and thawing. Openings from the sides of the cut to the ditches were shoveled at suitable intervals.

"The work performed by the men," according to State Highway Commissioner O'Neil, "was almost superhuman. Upon several occasions they worked continuously when the thermometer registered from ten to twenty degrees below zero. During the severe winter nights, when blizzards raged, sentinels were stationed at strategic points along the roads through the mountain districts to warn army truck trains and travelers of the danger of snow drifts and snow slides."

In New Jersey, as in Pennsylvania, a considerable mileage of road was kept open last winter, though, because of different administrative plans, the work was done by the county organizations instead of by the state. At the instance of the Highways Transport Committee of the Council of National Defense the State Highway Department requested certain counties to keep the roads clear. The counties involved—those traversed by the main lines of through traffic—did the work at their own expense, clearing the roads and permitting the operation of large numbers of army truck trains.

The Connecticut State Highway Department kept several hundred miles of through roads open during the winter of 1917-18 to expedite the transportation of general freight and war supplies from the large manufacturing cities on Long



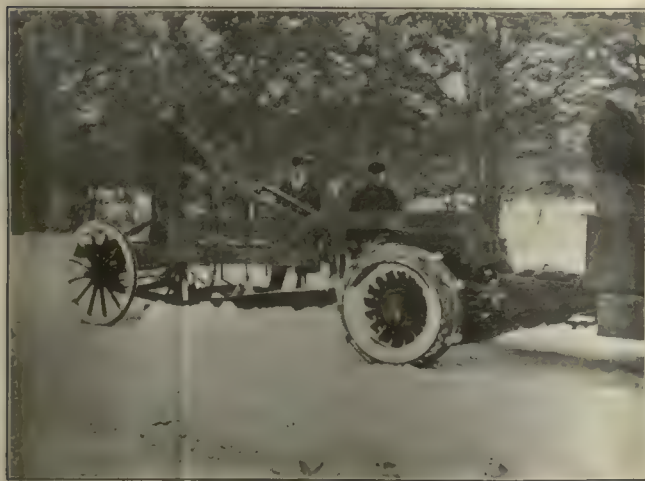
"20TH CENTURY" ONE OR TWO-HORSE SNOW PLOW, MADE BY THE BAKER MFG. CO.

Island Sound and in the valleys of the Naugatuck and Connecticut Rivers. Perhaps the most important section of highway on which work was done is that portion of the Boston Post Road situated between the New York state line and Bridgeport. The work was done by the division organization of the State Highway Department's repair department, and was described at some length in these columns. ("Snow Removal on a Connecticut Section of the Boston Post Roads," "Good Roads," March 2, 1918, page 123.) A truck equipped with a snow plow was used.

The total mileage taken care of in Connecticut last winter was about 970 mi., and the total cost about \$40,350. The rate per mile, including equipment, would be about \$45, according to W. Leroy Ulrich, Superintendent of Repairs. While most of the work was performed with snow plows attached to the front of motor trucks, as in the instance noted in the preceding paragraph, tractors and road machines of various kinds were used. On the routes carrying heavy motor truck traffic practically all of the snow was removed, while on roads carrying mixed traffic all but about 3 in. was taken off.

"The work was started whenever the snow had accumulated to a depth of over 5 in.," according to Mr. Ulrich, "and the necessity for moving great quantities of war industry materials, which could not be moved except by automobile truck, fully justified this procedure and the expense involved."

Although there was no state appropriation available last



AN OLD-STYLE "CHAMPION" ROAD MACHINE, MADE BY THE GOOD ROADS MACHINERY CO., DRAWN BY KNOX TRACTOR, WORCESTER, MASS.



"WESTERN REVERSIBLE" ROAD MACHINE, MADE BY THE WESTERN WHEELED SCRAPER CO., DRAWN BY A TRACTOR IN SNOW REMOVAL WORK.



"EUREKA" ONE-HORSE SNOW PLOW, MANUFACTURED BY W. M. TOY & CO.



"MARTIN" DITCHER, MADE BY THE OWENSBORO DITCHER & GRADER CO., IN SNOW WORK.

year a large amount of work was done in New York. Under the law the duty of snow removal rests upon the towns, and by their cooperation with the local home defense committees and the State Highway Department the route from the Pennsylvania state line through Buffalo and Albany to New York City was kept open for the Government convoys.

The Division of Highways of the Illinois Department of Public Works and Buildings made a determined effort last winter to clear all snow over 18 in. in depth from the state aid roads. There was not a great deal to be done, though in a few sections the drifts were bad, and in some instances, according to Maintenance Engineer B. H. Piepmeier, clearing roads cost about \$100 a mile. The roads over which the Division of Highways has jurisdiction are scattered over the state, and in most cases the work was done by shovelers. In some instances, however, teams and graders were used.

Michigan and Ohio, both of which include parts of the route used for the truck drive-aways that comprised a large and important part of last winter's highway traffic, also did considerable work.

In Michigan a total of about 520 mi. of highway was kept open. The routes included in this were the Alma-Detroit Road, the Lansing-Grand Rapids Road, the Lansing-Detroit Road, the Detroit-Toledo Road to the Ohio state line, and the Lansing-Chicago Road to the Illinois state line. The total cost of the work was nearly \$13,000, according to State Highway Commissioner Frank F. Rogers. Half of this sum was paid by the state and the other half, except for the sum of \$122.50 contributed by a Lansing automobile company,

was paid by the townships and counties in which the work was done.

Reports from various northern states having less war traffic than those along drive-away routes indicate that, except in the cases already noted, little, if anything, was done last winter.

Next winter will doubtless bring increased activity in all of the states where work was done during the winter of 1917-18 and will mark the beginning of work in a number of other states.

"Snow removal work will be pushed vigorously during the coming winter by the Pennsylvania State Highway Department," according to State Highway Commissioner O'Neil. "Plans are now being worked out whereby all roads, particularly those used extensively by the United States Government and for coal transportation to industrial centers, will be cleared for traffic. Transportation by motor truck, especially for local hauls, is assuming tremendous proportions in this state, and it is going to be an important problem in these abnormal times when congestion on the railroads is acute to keep Pennsylvania's roads in shape to meet the test during the winter months.

"Already we are preparing to fight the snow. Along the Lincoln Highway, at points where great drifts occur, snow fences will be erected. Additional trucks will be equipped with snow plows. Our highway superintendents will be instructed to organize snow removal emergency crews, particularly along such roads as the National Pike, the Lincoln

(Continued on page 102)



TRUCK WITH PLOW ATTACHED IN HEAVY SNOW ON A PENNSYLVANIA ROAD.



OPENING UP A DRIFTED ROAD IN ILLINOIS BY HAND SHOVELING.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

E. L. POWERS
Editor

T. A. HULBERT
Managing Editor

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Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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XVI

September 14, 1918

No.
11

NO PREFERENCE FOR ROAD BUILDING

Road building does not appear in the list of so-called essential industries that has recently been issued by the War Industries Board as a guide to the draft officials in the classification of the men who registered on Thursday of this week.

Two weeks ago, in commenting upon the announcement of a list of "non-essential" occupations and industries, we called attention to the inclusion of certain occupations in which a large portion of the men engaged in the construction and maintenance of roads and streets would be classed. We also pointed out that there are certain industries and occupations, such as the manufacture of munitions and the building of ships, that are so obviously war work as to leave no possibility of doubt as to their classification, and that there are certain other occupations and industries not so obviously war work, but nevertheless very essential to the carrying on of the war and the maintenance of the civil population.

Under certain conditions road building would come within the first classification; in practically all instances it comes under the second, and as such is not only essential, but vital to the successful prosecution of this war.

It is understood that the list of essential industries and occupations as given out by the War Industries Board has been approved by Provost Marshal General Crowder, but that the boards are to exercise discretion in its application and are not bound to follow it explicitly. In other words, it is understood that in individual cases the list may be either restricted or extended, and this seems to be the only means by which road building can receive proper recognition.

It is certain that if the list is followed the only experienced road builders available between the ages of 18 and 45 will be those who have been given deferred classification because of dependents or physical disability, and it should not be difficult to realize that any such situation would very seriously hamper road building operations for the period of the war.

Just why official Washington should take the attitude that it appears to take on road building is past understanding. With the matter constantly being brought before

nearly a dozen different departments of the Government and with the United States Highways Council supposedly passing upon all matters affecting road building, it would seem that by this time a realization of the importance of highway transportation and the necessity for building and maintaining roads uninterruptedly during the war would have been forced upon those in authority.

SNOW WORK ON RURAL ROADS

Snow removal work as applied to highways other than city streets is one of the many new problems that the war has forced upon road builders. Because it is of so different nature from the others it is necessarily more troublesome and methods of solution have been less well developed.

Until last winter the need of clearing country roads, even the most heavily traveled, had seldom been great enough to bring about any real effort towards its accomplishment; but by the time snow had begun to seriously impede traffic last winter there had developed a situation calling for immediate action. The exigencies of waging a great war four thousand miles away had resulted in an unprecedented volume of freight transportation. The railroads proved inadequate to take care of it, and shippers were obliged to turn to the motor truck for relief. The truck, already established as a freight carrier within cities and to a lesser extent between cities and towns, was found capable of meeting conditions.

Since the motor truck's usefulness is limited by road conditions one of the first results of its utilization in comparatively long intercity hauls was a demand for roads. To meet this three things were requisite: First, putting into shape to carry the traffic a large mileage of highways and keeping that mileage in condition; second, constructing a relatively small amount of new road to connect sections already improved, and, third, taking steps to make the more important routes available at all seasons.

Only the last involved matters outside the experience of most of the country's trained road workers. Most of the principles of construction and maintenance were well understood and had been crystallized into more or less standard practice, but in the matter of keeping roads open through the winter season there was little in the way of precedent.

In spite of this handicap the country's road builders rose to the occasion and kept open to traffic miles of road that had previously been closed for weeks during the winter. How some of them accomplished that strenuous task is set forth elsewhere in this issue.

The experience gained is to be utilized for further work next winter, as is also set forth on other pages. In most, if not all, of the states where war traffic is of considerable volume plans are being made to clear the roads and keep traffic moving throughout the year. These plans have not yet been fully matured, but there is every indication that ample provisions are being made and that the work is going forward with dispatch.

The importance of this work can hardly be over-rated. There is every reason to look forward to a demand for highway transportation next winter that will at least equal that of last winter. In fact, there is some basis for the belief that the roads will be called upon to bear an even greater burden. The production of war supplies has been speeded up very greatly during the past few months, with a consequent increase in freight traffic in certain districts. The American forces overseas are being augmented by large numbers monthly. As the numerical strength of the army grows its need of supplies will keep pace, and if the fighting continues through the winter, as has been predicted, there will be a sure increase in the production and shipment of supplies.

American road builders have a vital and somewhat difficult

task to perform between now and the spring of 1919. They are preparing for it, and may be relied upon to carry it out.

Provisions for Winter Highway Traffic

(Continued from page 100)

Highway, the Baltimore Pike, the Trenton Pike and the highway in Erie County connecting Ohio and New York; also along roads leading to and from important industrial centers. All of these highways will be patrolled thoroughly and these caretakers will be empowered to organize emergency crews should unusual conditions necessitate it."

It is expected that the New Jersey counties that undertook to keep their roads open last winter will continue the work along about the same lines next winter. The roads to be cleared are the main routes from the New York state line to tidewater and those from Newark and vicinity to Trenton. State Highway Engineer W. G. Thompson advises as follows relative to the state's participation:

"The State Highway Commission has as yet appropriated no money for this purpose. It is believed, however, that aid will be given some of the northern counties by the state. The reason for no definite action on the part of the state thus far is that until this summer the state controlled no mileage of the state highways. During the summer it took over some twenty miles from the counties, which became part of the state highway system and which the state will, no doubt, take steps to keep clear of snow."

The Legislature of New York has appropriated \$50,000 for this year's snow removal, and the State Highway Department is maturing plans for carrying out the work. In reply to an inquiry as to methods to be used, Commissioner Edwin Duffey said:

"Our information is to the effect that many of the localities secured good results by hauling road scrapers with either motor trucks or horses. Again, because the location of the heaviest drifts has been determined, the suggestion has been advanced that snow fences would prove of great value. The sum (the \$50,000 appropriation) in itself is insufficient to provide for the purchase of equipment to any great extent, so the most feasible method which has yet presented itself is the handling of the work by the rental of town scrapers and other equipment."

S. E. Bradt, State Superintendent of Highways of Illinois, reports on plans for next winter as follows:

"We have something like 400 mi. of state aid roads in Illinois, on which the state is required to pay all the cost of maintenance. The roads are scattered in 102 counties of the state, and their average length is less than 2 mi. * * * If we had a large mileage of state aid roads in any one county we would make definite arrangements for the removal of the snow by some type of snow plow, but inasmuch as the roads are scattered we find that the work can be done by shovelers much more practically and economically. We are, therefore, making no definite plans for the removal of snow on our roads next winter, but expect to arrange for the shoveling off of the drifts as they may impair traffic from time to time."

Present indications are that, except in Connecticut, the state highway departments in New England will take little part in such snow removal as is undertaken.

No efforts have been made to clear state highways in Maine, according to Chief Engineer Paul D. Sargent of the State Highway Commission, and no plans are being made for keeping them clear next winter. At present these roads are not carrying truck traffic to relieve the railroads, but if such traffic has to be taken care of, he states, every effort will be made to meet the condition.

Similar conditions are reported by State Highway Commissioner F. E. Everett of New Hampshire. There is a possibility, however, that an appropriation for snow removal work will be made when the Legislature meets next winter.

The Massachusetts Highway Commission has no authority to clear snow from the highways, and the situation is summed up by Chief Engineer A. W. Dean as follows:

"The law under which this commission works provides that a city or town in which a state highway lies 'shall, at its own expense, keep said highway sufficiently clear of snow and ice to be reasonably safe for travel. This has not been construed by the cities and towns as meaning that they must keep them clear for truck travel in winter. A bill was presented to the Legislature of Massachusetts in 1918 that would provide for clearing such main roads as the Massachusetts Highway Commission should consider necessary, but this bill did not become a law; consequently this commission has no plans for clearing snow and ice next winter, and has done no such work in the past."

In Rhode Island similar conditions obtain. Chief Engineer I. W. Patterson of the State Board of Public Roads reports as follows:

"Under the law covering the operation of this department the matter of snow removal upon state roads is wholly in the hands of the towns in which state roads are located. There have been several attempts to place the responsibility for snow removal with this department by act of our Legislature, but to date all of these attempts have failed.

"The clause in our law referring to removal of snow and ice reads as follows: 'Every such town or city shall, at its own expense, keep such state road within its limits respectively sufficiently clear of snow and ice so the same shall be reasonably safe for travel as now required by law.'"

In Delaware the State Highway Department did nothing in the way of snow removal as there were no highways under state control. These conditions will not obtain next winter, however, and the department will be concerned with the work. The officials expect to go into the problem very thoroughly, but plans have not been matured as yet.

The Wisconsin Highway Commission expects to keep a considerable mileage of highway open during the coming winter, but has not yet developed plans for carrying on the work.

In most of the western and northwestern states snow removal is either impracticable or not warranted by the traffic that would be accommodated, according to reports received from state highway officials.

In Idaho no attempts were made to handle the snow situation last winter, nor will such work be undertaken next winter. Snow fences have been built where drifts are likely, but the nature of the country and the enormous distances between centers of population make the cost of any further measures prohibitive.

Highway Engineer Frank S. Peck, of South Dakota, reports that snow removal has received very little attention in that state and that the idea of undertaking it is not received favorably by county authorities. "We are looking forward to the day," he writes, "when our state and federal roads, which are in the process of building, are completed, and then we can bring pressure enough to keep the snow off the roads during the winter months."

No effort to keep the roads clear during the winter has been made in Wyoming, and no plans for such work during the coming winter have been made. Conditions in that state are described by State Highway Engineer Z. E. Severson as follows:

"Conditions in Wyoming are different from those in the eastern states because the snow-fall is usually very light and is blown away by the winds except where conditions make a large number of cuts. Especial attention is given this matter at the time of construction of the road so that,

so far as possible, the road is kept above the level of the adjacent country. When this is done the road is practically free from snow the entire season.

"National transportation has not developed in this state to the point where special plans must be made for snow removal."

In the state of Washington the snow-fall is either so little that removal is not necessary or so great that it is impracticable. There is no snow problem in the portion of the state west of the Cascade Mountains, as there is ordinarily very little snow-fall, and on the rare occasion when there is any considerable fall it melts away within two or three days at the most. In the eastern section of the state there is a greater snow-fall in perhaps half of the counties, but the roads are seldom affected for more than a few weeks, and almost never for more than two months. So far as the State Highway Department's information goes, according to Chief Engineer George F. Cotterill, no systematic effort has been made to deal with the snow problem in those localities.

There is one road in the state, the Sunset Highway, crossing the Cascade Mountains, and thus connecting the eastern and western portions of the state. The snow-fall on the portion over the mountains is very heavy and closes the road for five or six months each winter. Before the winter is over there is often an accumulation of from 20 to 30 ft. of snow at the summit, and while it would be very important to keep this road open—and the matter has been given considerable attention—it has not been found economically practicable to do so.

There is a great demand for the use of the highway during the spring, and many suggestions have been made for hastening its opening, but so far the only thing that it has been found practicable to do, according to Mr. Cotterill, is to expend about \$1,000 during May or early June in plowing or shoveling out the deeper snow in cuts or other sheltered places where it would remain much longer than on the exposed sections. By this means it has been possible to hasten the opening of the highway by about two weeks.

Very similar conditions exist in Oregon, where, according to State Highway Engineer Herbert Nunn, snow is not a problem.

The mechanical equipment available for snow removal work may be divided into three general classes: First, plows for attachment to motor trucks; second, wheeled road machines of various types, and, third, plows or scrapers similar in design and operation to the ordinary road drag or plane. In addition there is at least one type of rotary plow on the market.

All three of the general types were used extensively in last winter's work, and all are shown in the accompanying illustrations. A typical example of the first class of equipment was that used in the work on the Boston Post Road in Connecticut, to which previous reference has been made. This outfit consisted of a Riker truck equipped with a "Champion" plow, manufactured by the Good Roads Machinery Co. It is shown in one of the accompanying illustrations. Trucks of various makes, similarly equipped, were used very extensively in Pennsylvania and in other states last winter.

One such outfit, used in Flathead County, Montana, is shown in one of the accompanying illustrations. It consisted of a plow attached to a federal motor truck owned by the county, and was built at a total cost of about \$100. The plow was constructed in much the same manner as a railroad plow, and was hung from a heavy timber bolted to the front end of the truck. It was built of wood faced with sheet tin and provided with a $\frac{1}{4}$ -in. steel cutting edge. The elevation of the plow was regulated by a block and tackle attached to a heavy timber extending perpendicularly from the nose of the plow.

A plow of this type, known as the "Baker auto truck snow plow," is made by the Baker Manufacturing Co. One

of these attached to a truck is shown in one of the accompanying illustrations.

The second type comprises road machines, scrapers and graders of various types drawn by horses, motor trucks, tractors or other means. An outfit of this type that can be used advantageously where the road to be cleared is occupied by street car tracks is shown in one of the accompanying illustrations. The machine is a traction grader, manufactured by the Acme Road Machinery Co., hauled by the derrick car of the New York State Railways in Utica, Frankfort, Oneida, Canastota and other points in northern New York. It was used last winter in snow up to 6 ft. in depth, often under very unfavorable conditions.

A machine of a similar type is shown in the illustration of a "Western" reversible grader, manufactured by the Western Wheeled Scraper Co.

Another use of a road machine is shown in the illustration of the apparatus used in Worcester, Mass. This consists of a Knox tractor and an old style "Champion" road machine, manufactured by the Good Roads Machinery Co. The front wheels of the road machine were removed and the rear portion attached to the tractor by means of a goose-neck. The tractor was originally a three-wheel tractor of the usual type, but was changed to a four-wheel machine by attaching to it the front wheels, springs and steering gear of another motor vehicle.

Another road machine that is used in snow removal work is the adjustable leaning wheel road grader, manufactured by J. D. Adams & Co. It is adapted to use with a team, motor truck or tractor.

Another machine of this type is the "Little Ideal" snow plow, manufactured by the Galion Iron Works and Manufacturing Co. This is a modified form of the Galion company's road machine of the same model, and can be used with various kinds of motive power.

The third class of equipment is illustrated by the "Eureka" one-horse snow plow, manufactured by W. M. Toy & Co., and the "Martin" ditcher and grader, manufactured by the Owensboro Ditcher and Grader Co. Both of these are shown in the accompanying illustrations. The former is a V-shaped steel plow, made in various sizes. The Martin machine has a single cutting blade set at an angle with the roadway and a guide blade which follows the line of the road. It is made of wood and steel and can be operated by a motor vehicle or by horses.

A machine that is in neither the second nor third types as classified here, but that embodies the principles of both, is the Baker "20th Century" snow plow made by the Baker Manufacturing Co. This consists essentially of a mould-board mounted on a two-wheeled truck, with a seat and operating levers. It is designed especially for use with one or two horses as motive power.

The rotary machine, previously referred to, is known as the Stadig rotary snow plow and is manufactured by the Canadian Fairbanks-Morse Co. It was described in detail in "Good Roads" for May 25, 1918. It consists of a frame on two sleds which carry two four-bladed rotary cutters, which cut out the snow and discharge it through openings at the sides. The machine is drawn by horses, the cutter being operated by a gasoline engine.

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The County Commissioners of Allegheny County, Pennsylvania, according to a recent report, intend to propose to the next Legislature the passage of a law regulating the weight of loads which may be hauled over improved roads of the county by automobile trucks. The county roads are carrying a very large amount of war traffic and the roads are rapidly deteriorating under it. The million-dollar appropriation for repairs during the present year has been practically exhausted, and very little construction has been undertaken because of the high cost of labor and materials.

Army Motor Transports Corps Created

War Department Makes Radical Change in Organization of Transportation Division

The War Department has recently authorized a statement describing the creation of a motor transport corps to take over the complete control of all motor vehicles used in the army. The statement is particularly interesting to road builders as showing the importance of the motor truck in modern war and emphasizing the part played by roads in military operations. The statement follows:

"In preparation for the more rapid movement of troops and supplies of the American Expeditionary Forces the War Department, in orders just made public, has made a sweeping change in organization by creating a motor transport corps to take over complete control of all motor vehicles in the army, from bicycles to motor trucks. This service, which has heretofore been a part of the Quartermaster Corps, has grown to such proportions that it has been found necessary to establish it as a separate corps, and its further rapid expansion is planned.

"The French and British armies long ago adopted the plan of putting their entire motor equipment under a single head, and experience in handling our forces in France has demonstrated the necessity of similar action on the part of the United States. All equipment and personnel in the various corps, with the exception of tanks and caterpillar tractors, is transferred to the new corps, which is being organized by Col. Charles B. Drake, a graduate of West Point, class of '96, and an officer experienced in motor transport work. Eventually his command will consist of approximately 5,000 officers and 200,000 men.

"Among the many advantages sought by the creation of the motor transport corps is the more perfect standardization of equipment, resulting in greater efficiency and economy of operation and permitting a more fluent interchange of drivers and parts. The problems of supplying parts and making repairs will be greatly simplified.

"The present motor establishment in France includes many repair stations, some of them operated by from 500 to 1,500 mechanics and other skilled men each; but the program of the motor transport corps provides for greatly increased facilities along these lines. Repair work is carried on in garages, parks, depots and reconstruction shops. A service park is a mobile garage, which can be moved rapidly to any point where it is needed. An overhaul park is a large station where heavy repairs can be made, and a reconstruction park is equipped to completely rebuild broken-down or shell-shattered machines. Under the new organization the work of salvaging damaged machines, already highly developed, is to be given increased attention. All this work is necessarily in the hands of skilled men, and the personnel must be greatly increased to provide the transport service that will be needed next year.

"While the motor transport corps handles many kinds of motor-propelled vehicles, the army truck is the most important, and the demand for men especially qualified to drive and handle the trucks is great. Men qualified for this work by their experiences in civil life have offered themselves in numbers, but it has been found necessary to establish several motor transport schools in addition to the one at Jacksonville, Fla. In these schools candidates will learn, under competent instructors, the intricate mechanism of gas engines so that they will be qualified to keep their trucks running under the trying conditions existing along the front lines, where their principal work will be done.

"Men sent to these camps will be carefully chosen, as the work requires initiative and ability. Among those who have already enrolled are many who occupied positions of respon-

sibility in civil life. At Jacksonville now are bankers, high-salaried executives, engineers and men of many professions, who have been attracted to the corps by its opportunities for active service overseas after a comparatively short course of training. With the increasing use of motor transport in moving troops from point to point on the battle line the life of the motor driver is becoming progressively more adventurous and exciting.

"Motor trucks are taking a more vital part in each successive big battle. In the recent counter offensive of the French and Americans at Chateau-Thierry motor trucks carried several regiments of troops to critical points in the line and supplied them with heavy and light guns, ammunition, horses, mules and even wagons for supply train use over terrain that was not feasible for motor vehicles.

"Motor trucks made it possible for the French to concentrate troops, ammunition and supplies sufficient to stop the Germans at Verdun. When German aviators destroyed the railroad facilities Gen. Joffre called motor trucks into service to replace the wrecked trains, which they did with entire success. In attacking along the Marne recently the American units were supported by machine guns mounted on trucks, and even passenger cars, which swept the enemy lines with a storm of fire. Trucks were also used extensively to bring up reserves to points of the line where they were badly needed. Much of the work of the corps must be done at night, and it is well known that much used roads near the front are regularly searched by the enemy artillery, so that the motor transport service, while technically non-combatant, is really quite as active and dangerous as many fighting branches."

State Highway Departments and Bituminous Material Conservation

United States Highways Council Outlines Duties of State Officials in Connection with Applications for Road Materials

In a recent bulletin issued by the United States Highways Council, outlining the procedure to be followed by applicants for bituminous materials for use in highway work, there is included a statement of what the state highway departments should do. This portion of the bulletin is as follows:

"1.—Give as much publicity as possible to the order of the Fuel Administration and advise engineers, contractors and other interested parties as to the procedure which should be followed in order to obtain a permit for release of bituminous road materials.

"2.—Bring to the attention of the Fuel Administration all known violations of the order, giving the name and address of the producer who sells material without permit and the location to which the material has been shipped. Cases have come to notice where fuel oil, for which no permit is required, has been sold as such and illegally used for treating roads.

"3.—Do not approve an application unless genuine, urgent necessity is known to exist for the work described. The approval by the state highway department should not be considered merely a matter of form, but a patriotic duty in assisting the Federal Government to maintain an adequate fuel supply for war needs and to place the available materials where they will do the most good. Do not forward applications which cannot be conscientiously approved.

"4.—Forward promptly all applications which are approved, and do not hold them until a large number have accumulated, for this tends to hold back the issuances of permits for important work where the material may be needed at once.

"5.—See that all applications which are approved are completely filled out by the applicant so that the council will

have as much information as possible upon which to base its action. In the approval give any additional information which might be of value to the council, calling attention to the importance of the work or to any doubtful features that are involved.

"6.—Requests for material for maintenance by surface treatment and repairs for a number of roads may be included in a single application provided the quantities and classes of materials to be purchased from each producer are shown where more than one producer is concerned.

"7.—See that an individual application is filed for each road which is to be reconstructed or constructed.

"8.—Conditions may arise in certain localities that will render it unnecessary to restrict the use of these materials to the same extent as in other localities. Thus oil, asphalt or tar may be available in certain sections from which it cannot be readily moved to other sections where a shortage exists, or tar may be available at certain small plants in rural districts, which, owing to the lack of storage facilities, it would be impossible to conserve for fuel purposes. Information in connection with such conditions is requested from the state highway departments so that special provisions may be taken to care for these unusual conditions."

Engineers and Town Planners for Housing Projects

Department of Labor Announces Appointments for Several Projected Housing Developments

The Bureau of Industrial Housing and Transportation of the U. S. Department of Labor has announced the appointment of town planners and engineers for a number of projected housing developments as follows:

Dayton, O., town planner, F. Vitale, New York, N. Y. Eddystone, Pa., town planner, John Nolen, Cambridge, Mass.; engineer, Charles F. Mebus, Philadelphia, Pa. Elizabeth, N. J., town planner, A. F. Brinkerhoff, New York, N. Y.; engineer, C. D. Pollock, New York, N. Y. Pensacola, Fla., town planner, Favrot & Livaudais, New Orleans, La.; engineer, Arthur Pew, Atlanta, Ga. New Orleans, town planner, Favrot & Livaudais, New Orleans, La.; engineer, J. W. Billingsley, New Orleans, La. Watervliet, N. Y., engineer, P. E. Green.

State Councils of Defense to Advise Upon Building Projects

War Industries Board Calls Upon State Bodies to Assist in Passing Upon Essentiality of Proposed Civilian Work

The War Industries Board has called upon the state councils of defense to assist in the investigation of proposed civilian construction projects. In an authorized statement by the War Industries Board it is said that the recommendations of these local organizations will not be final, but that they will be followed "to the extent that no application for materials for projects coming within their jurisdiction will be considered by the War Industries Board until the council has reported."

The projects coming within the jurisdiction of the state councils will not include those directed by or under contract with the War or Navy Departments, the Emergency Fleet Corporation, the Bureau of Industrial Housing and Transportation of the Department of Labor and the United States Housing Corporation. It will also not extend to the following:

"Roadways, buildings and other structures undertaken by

or under contract with the United States Railroad Administration or a railroad operated by such administration.

"Public highway improvements and street pavements when expressly approved in writing by the United States Highways Council."

Motor Traffic and Highways in China

Brief Descriptions of Conditions in Hongkong and Manchuria

Interesting data on the use of motor vehicles and the condition of public roads in Hongkong and Manchuria is given by Consuls A. E. Carleton of Hongkong and A. A. Williamson of Dairen in a recent issue of the "Commerce Reports."

Considerable attention has been given to highways by the Government of the colony of Hongkong for some years past, according to Consul Carleton, and within the past three years great progress has been made in extending the mileage of roads. This has been due very largely to the demand from automobilists for highways to carry pleasure traffic. From a few miles of available highways the mileage has increased to 110 and plans have been made for the building of about 35 mi. more. The colony has appropriated about \$144,000 for maintenance and \$547,500 for construction, and the greater portion of this has already been expended. Further appropriations are expected.

On the island, and to some extent on the mainland, asphaltic wearing surfaces are being laid on concrete foundations. The climatic conditions are especially severe, as the rainfall averages 80 in. annually.

Practically all of the traffic is that of pleasure cars. It is stated that of all the automobiles in the colony, there are probably not half a dozen that are ever used for business purposes. The number of vehicles licensed includes 175 motor cars, 5 motor trucks, 1,244 hand trucks, 2,642 rickshas and 869 chairs, practically all of the motor cars being of American manufacture. The hand truck referred to is a two-wheel affair hauled by coolies, and is the principal vehicle employed for bringing merchandise from the docks to the shops and for the transportation of other heavy articles. It is stated that as Hongkong is not a manufacturing center, this method of handling goods is more satisfactory than it might seem for a total population of approximately 500,000.

Few roads suitable for motor vehicles have been built in Manchuria, according to Consul Williamson. There are at present but three places to which cars are ordinarily run from Dairen. These are Star Beach, a seaside resort about 5½ mi. away, Rokotan, some 3 mi. from the city limits, and Fukasho, a watering place about 6 mi. away. The road to Star Beach was built especially for automobiles and rubber-tired vehicles, and is a good road. The other two, originally built by the Russians, have been well maintained but are not nearly as good as the Star Beach road. There is a fair road to Port Arthur, 33 mi. away, but one or two bad places make it impassable for motor cars. It is expected that this road will be improved in time.

The cost of road building is borne entirely by the general government, but it is difficult to separate the cost of road work and street work. Considerable sums have been spent on the streets of Dairen and they are now in good condition. They are built with bluestone covered with hot tar and gravel and thoroughly rolled, and are very similar to asphaltic pavements.

The usual method of transporting goods is by Chinese cart. This is a heavy two-wheeled cart drawn by two or more mules or horses and is very destructive to roads. Heavy carting in cities is limited to certain routes and streets and the carts used must be equipped with 4-in. tires.

There are about 50 passenger automobiles and two or three trucks in Dairen. One of the trucks is used by the post office for the transportation of mail. Practically all of the automobiles are of American manufacture.

MEETINGS

Calendar of Coming Meetings

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

PERSONAL MENTION

C. L. De Mott has been elected city engineer of Lynchburg, Va., to succeed H. L. Shaner.

Robert P. Marsh has been appointed superintendent of streets and engineering of Springfield, Mass.

J. A. Burnett has been appointed public utility commissioner of Denver, Colo., succeeding A. O. Anderson.

Col. T. Hugh Boorman, consulting engineer, has opened an office at 703 Fifteenth St., N. W., Washington, D. C.

E. R. Mack, Park Engineer of Wilmington, Del., has been given leave of absence to engage in Y. M. C. A. work in France.

H. L. Shaner has resigned as city engineer of Lynchburg, Va., to become chief engineer of construction for the John T. McKinney Construction Co.

Charles A. Grubb of Wilmington, Del., has been appointed state highway commissioner of New Castle County, Delaware, to succeed the late James Wilson.

Wesley Rowell, for the past two years city engineer of Rensselaer, N. Y., has entered the employ of the Government in connection with coal production in Virginia.

H. L. Gillette, Assistant Division Engineer of the New York State Highway Commission at Binghamton, has been given a captain's commission in the Engineer Corps of the U. S. Army.

Lieut. Robert E. A. Macbeth, who prior to his enlistment was assistant city engineer of Toronto, Ont., was killed in an aviation accident at a training camp near Birmingham, England, last month.

George F. Wiegardt of Baltimore has been appointed highway engineer of that city to succeed Major R. M. Cooksey, resigned. Previous to his appointment Mr. Wiegardt had been engineer of the Water Department for about two years. He is a native of Baltimore and graduated from Cornell University in 1909.

L. F. Collins has been appointed truck sales manager of the Nash Motors Co. to succeed H. C. Hart, who is in the service.

Paul Starbird, County Surveyor of Huron County, Ohio, has been given a commission in the Engineer Corps of the U. S. Army.

Alexander Dougherty, Assistant Park Engineer of Wilmington, Del., has been given leave of absence for the duration of the war and is at Camp Dix.

H. C. Hart, formerly truck sales manager of the Nash Motors Co., has received a captain's commission in the Ordnance Department of the U. S. Army.

C. A. Forter of the John Baker, Jr., Co., has been commissioned a first lieutenant in the Sanitary Corps. Lieutenant Forter served as office engineer in the city engineer's office of Topeka, Kan., for a number of years.

Capt. J. J. Gaillard became district engineer of the Portland Cement Association in charge of the Atlanta office on Sept. 1. Capt. Gaillard has been with the organization since Jan. of this year.

The Maintenance of Wisconsin's State Trunk Roads has been carried out by the patrol system since May 1, and there are now 555 patrolmen employed. Although the system has been in operation only a short time the results obtained so far are very satisfactory, according to reports.

The Benefits of Motor Express are shown by results obtained between Cleveland and Akron, O. According to a recent report it is now cheaper and quicker to send express matter between the two cities by motor truck than to send it by freight, railroad express or electric railroad.

The Henry Hudson Drive along the west shore of the Hudson River, between Albany and New York, will soon be opened to traffic, according to a recent announcement. The drive includes the road around Storm King Mountain, a description of which was printed in "Good Roads" for Dec. 8, 1917.

The Soldiers at Camp Upton, L. I., are macadamizing one of the main thoroughfares leading to the camp. The road under improvement is known as the Tangier Military Road, and leads from the South County Road in Tangier to Camp Upton. It was built by the Army last winter, but as it was not surfaced was impassable at times.

Road Building in Siam has not yet assumed sufficient importance to indicate any extensive use of motor vehicles in the near future, according to Vice-Consul C. C. Hansen of Bangkok in a recent issue of the "Commerce Reports." The southern part of the Siamese kingdom, according to Mr. Hansen, is an alluvial plain, often flooded during the rainy period, in which road building is difficult and often impracticable. Transportation in this area is largely by canal. In the northern part of Siam and in Siamese Malaya some road work is being done in connection with extensive railway development, but there appears to have been no appropriation made for road building during the past fiscal year except the customary annual appropriations for the Department of Ways. There are about 50 mi. of macadam road in Bangkok, the capital, and these are kept in proper condition for motor traffic. There are about 1,100 motor vehicles in the city, of which 300 are trucks of from 1 ton to 2 tons capacity.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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The Maintenance of Drainage

Care of the Roadway and Installation of Adequate Drainage Useless Unless Maintenance of Drainage Is Attended To

By R. A. MEEKER*

We are constantly being reminded that it is our duty to utilize all of our available materials—of the necessity of conserving our resources. The slogan is: Save! Save for our country's life! Save for humanity! How can we do this? What are the best means of attaining this much desired end? These are the questions that are being asked on every hand. One of the answers is: Maintain the roads.

The economic value of good roads is recognized now as never before. Good roads are an asset, bad roads are a liability. A good road saves time, power, energy and temper. As it is not possible to rebuild all of the roads heretofore improved it becomes our duty to maintain those that we have in the best possible condition at the least expense. To maintain the surface it is necessary to add some new material, but the most important thing to do is to secure a firm, thoroughly drained foundation. We are urged to drain, drain, drain. This is right; it is good advice as far as it goes, but it does not go far enough. Maintenance has

been preached, drainage has been urged, but the maintenance of drainage has received little notice. No matter how well a road is built, no matter how carefully the drainage system is designed, failure will follow if the drainage system is not constantly inspected and maintained in good working order.

Years ago the writer was often laughed at and called a drainage crank. One day a road official called the writer's attention to a break in a road that had been built under the latter's supervision two years before.

"Look at that," said he, "what good did your underdrains do there?"

"Did the road break at this spot last spring," was asked.

"No," he answered, "but look at it now."

"Very well," the writer answered, "let us examine the outlet of the drain."

This we did, and found it choked with weeds and dirt so thoroughly that not a drop of water was running out. A shovel and pole were obtained and the dirt and weeds were removed from the outlet, then the pole was pushed into the



POORLY DRAINED ROADS—EXAMPLES OF NEGLECTED DRAINAGE.

*Consulting Engineer, Newark, N. J., formerly State Highway Engineer of New Jersey.

drain until the water began to run out. This it did with such force that the drain was soon clear. The next day the drain was visited, and a steady stream of water was seen flowing out. The break in the road was repaired, and for five years afterward the road did not show a break in the foundation because the same road official who had scoffed at underdrains carefully watched every underdrain outlet under his jurisdiction and insisted that they be kept clear.

In two instances it was discovered that no water was running out of the drain, though the ground was very wet. A careful inspection of the surface over the line of the drain disclosed wet, soft spots on the side of the road. Upon digging down the drain was found to be mashed so flat that water could not run through it, and, as a consequence, it had found its way to the surface. The cause of the breakage was easily discovered, as a deep rut in the earth shoulder was plainly to be seen. A further inquiry revealed the fact that this portion of the road had been filled with snow,

drifts and that a track had been broken through on the side of the road where the underdrain was located, because the drift did not happen to be so deep at that point. Then because of the great mass of snow in the drift upon the pavement the travel continued to follow the cleared track along the earth shoulder. After the spring thaws began, and thus before the snow bank on the pavement disappeared, the frost was all out of the bared ground of the shoulder, making it so soft that the drain, though 30 in. under the surface, was mashed. These two illustrations indicate how very possible it is for underdrains to be put out of commission, and, as a consequence, how necessary it is that they receive constant attention.

No matter how good your pavement, no matter how perfect your system of drainage, the road will fail if the drainage is neglected. Maintain your road, maintain its surface; but above all things look constantly to the drainage if you would get the full value out of your road investment.

Abrasion Test for Mineral Aggregates*

Suggested Modification of the Deval Test for Stone, Gravel and Similar Materials

By H. H. SCOFIELD †

The resistance of stone, gravel and other materials to the abrasion of traffic must be recognized as an important quality, and the wise selection of such materials would be considerably aided by a rapid and efficient laboratory test. Its result, of course, should be studied in connection with the important test of service.

The writer has previously called attention to a seeming weakness in the standard Deval test in that the dust resulting from the abrasion is retained in the container and acts as a cushion, which reduces the loss in the later stages of the test. This is illustrated by the results of the tests shown in Table I. In these tests a medium stone and an extra soft stone were tested by the standard Deval machine.

It is evident that the ratio shown in the table would be considerably larger were the container arranged so as to

A simple abrasion machine which does away with this objection is a small type of rattler, from which the dust escapes as fast as formed. The abrasion chamber is octagonal in shape and has a volume equivalent to that of the Deval cylinder, but with 1/16-in. openings between the staves, which allow the dust to escape.

The results of tests upon twelve Indiana limestones, made with this apparatus in the testing materials laboratory of Purdue University,* are shown in Table II. This new test

TABLE II.—TESTS OF 12 TYPICAL INDIANA LIMESTONES WITH THE STANDARD DEVAL AND NEW ABRASION TEST APPARATUS.

Sample No.	Wear, per cent.		Ratio of new to Deval test
	Deval test	New test	
1.....	3.50	8.10	2.30
2.....	4.15	9.10	2.19
3.....	3.90	9.60	2.46
4.....	3.76	9.70	2.58
5.....	3.60	10.30	2.86*
6.....	3.00	10.50	3.50*
7.....	4.10	11.80	2.90*
8.....	5.56	14.10	2.54
9.....	6.00	14.70	2.45
10.....	6.05	16.30	2.70
11.....	6.00	20.20	3.36
12.....	10.30	35.20	3.42

*One test only.

TABLE I.—TESTS TO SHOW EFFECT OF DUST IN DEVAL ABRASION APPARATUS.

Kind of test.	Wear, per cent.		Ratio of soft to medium
	Medium stone	Extra soft stone	
Deval test, regular (10,000 revolutions)	5.28	10.3	1.95
Deval test with all dust removed after every 1,000 revolutions....	10.7	25.8	2.41

TABLE III.—TESTS OF BROKEN STONE WITH THE NEW APPARATUS UNDER VARYING CONDITIONS AS TO CHARGE AND NUMBER OF REVOLUTIONS.

Sample	Abrasive charge	Number of revolutions	Wear, per cent.	
			Medium stone	Soft stone
Deval test—	None None 6, 1½-in. shot "	10,000	5.28	10.30
50 pieces, 1 kg.		2,000	12.30	35.20
New test—		2,000	5.30	14.90
50 pieces, 1 kg.		2,000	6.00	17.10
25 " " " " "		4,000	10.00	27.10
25 " " " " "		6,000	12.40	35.10
25 " " " " "		8,000	16.60	42.50
25 " " " " "		10,000	19.30	48.20
1 to 2 sizes		2,000	7.40	19.30
1 to 2 " " " " "		2,000	9.70	24.60
1 to 1 " " " " "		2,000	9.90	23.00
1 to 1 " " " " "		2,000	9.90	23.00

remove the dust as fast as formed. This has been done with success in one or two laboratories.

*Abstract of a paper entitled, "An Abrasion Test for Stone, Gravel and Similar Aggregates," presented at the twenty-first annual meeting of the American Society for Testing Materials, Atlantic City, N. J., June 25-28, 1918.

†Purdue University.

in general gives a great range of results and a consequent better differentiation of quality. The effect of the dust cushion in the Deval test is apparent in the more or less regular increase in the ratio of the results of the new test

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Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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OUR AIM

In these times there is one common cause that must take precedence over all other things. Until Germany has been beaten—thoroughly and permanently—all of the efforts of all of us must be directed toward that end.

It is unnecessary and impossible for all to fight on land or on the sea, for all to make munitions or produce food or furnish transportation for men or materials. Modern warfare is a tremendously complex and intricate enterprise. There must be actual fighters in the battle line and other soldiers in the so-called non-combatant branches to keep the men at the front supplied with ammunition and supplies and to perform the varied functions incident to war. These in turn must depend upon a civilian army engaged in the production of food, munitions and supplies of various kinds, in transportation and in the almost numberless industries and commercial undertakings required to meet the needs of the army and the civilian population.

There are few things, even the production of munitions, food and clothing, that are more essential to the successful termination of the war than transportation. The enormous forces employed in this war cannot "live on the country." Their supplies of munitions must be brought to them from distant sources of supply; their equipment must also be brought to them. All this has been pointed out in these columns and should need no further emphasis.

Under these circumstances the duty of "Good Roads" is clear. It rests upon us to employ every means at our disposal to further such highway work as is required to meet present conditions, for transportation is primarily a matter of highways. As the dominant publication covering a field which includes not only the construction and maintenance of roads and streets but also highway transportation, there lies before "Good Roads" an opportunity for patriotic service that will be made the most of.

Because of the need to conserve paper stocks all publications have been ordered to reduce the tonnage consumed, leaving to publishers the choice of complying by a reduction in the quantity (measured in reams) or the weight. While obedience to the order entails some sacrifices on the part of the publishers it will be possible to comply fully with both the letter and the spirit of the order

without detriment to readers' interests. Like all other patriotic publications, "Good Roads" will reduce its consumption to or below the required minimum, but will continue to give its readers the service to which they are accustomed. From now until the war is over "Good Roads" will devote its entire strength to bringing about that end by exerting its utmost efforts in the field it occupies. No one thing will "win the war," but there is one thing without which all the factors in winning would avail nothing. That is transportation. The public roads are at the very foundation of all transportation, and the mission of "Good Roads" is to aid in every possible way the road work that is required at this crisis in the nation's life.

MAINTAIN THE DRAINS

Timely emphasis is laid on an essential element of road maintenance in the first article in this issue. The need for drainage and the need for maintenance have been urged repeatedly, as Mr. Meeker points out. In urging the maintenance of drainage he focuses attention upon something that ought to be obvious, but that is nevertheless all too frequently neglected or given but perfunctory attention.

Road work, including in that broad term not only construction but also reconstruction, repair and maintenance, is engineering. Moreover, it is a highly specialized branch of engineering and one that calls for a degree of skill and knowledge equal to that demanded of specialists in many other engineering lines. This has not been generally recognized in the past, but it is beginning to be.

Like all other branches, highway engineering rests upon a foundation of judgment and common sense and the most successful road builders are men possessed of the most of those two qualities. Among such men Mr. Meeker stands very high, and his words carry the weight of years of valuable experience in a position of responsibility and authority.

Just as the author of "The Maintenance of Drainage" needs no introduction to the readers of "Good Roads," the strength of what he has to say cannot be enhanced by anything that can be added here.

Maryland Convicts are doing satisfactory work on the roads of that state and in stone quarries, according to recent advices. Considerable numbers of prisoners are used both in repair work and in the preparation of materials in various stone quarries in the state.

The City of St. Louis, Missouri, has been asked to expend \$300,000 annually for the improvement of roads in St. Louis County. This request was embodied in a resolution adopted by the St. Louis County Vehicle Owners' Club, and copies of it have been presented to Mayor Kiel of St. Louis, and to the Board of Public Service of that city. It is pointed out in the resolution that St. Louis County expends about \$400,000 a year for road work and that 90% of the traffic in the county is on roads leading to the city.

The State of Missouri will secure a large amount of additional money for road work if one of the proposed amendments to the state constitution is indorsed by the voters at the election on Nov. 5. This amendment provides for a levy of 10 ct. on each \$100 of taxable property in the state for road purposes, half of the amount collected to go to the state road fund, one-fourth to be distributed among the counties and the City of St. Louis on the basis of area, and one-fourth to be distributed to the counties and the City of St. Louis on the basis of population.

Abrasion Test for Mineral Aggregates

(Concluded from page 108)

to those of the Deval test as the material tested varies from hard to soft.

From these tests it became apparent that in order to shorten the time to a practical limit it would be necessary to use an abrasive agent and to cut down the size of sample from 5,000 to 2,500 g. Further tests also indicated that one-half the sample should be from $\frac{3}{4}$ to 1 in. in size and one-half from 1 to 2 in. in size. The standardized test, as operated at present, is as follows:

The sample weighs 2,500 g., of which 1,250 g. are from $\frac{3}{4}$ to 1 in. in size, and 1,250 g. are from 1 to 2 in. in size. The abrasive agent consists of a charge of six cast-iron spheres $1\frac{1}{4}$ in. in diameter, as used in the rattler test for paving brick. A charge of broken stone is given 2,000 revolutions and a charge of gravel 4,000 revolutions, in each case at the rate of 30 revolutions per minute. The loss for either stone or gravel in this shorter test is approximately the same as for that for a full 5,000-g. sample given 10,000 revolutions without an abrasive charge.

The results of tests upon broken stone under different conditions as to charge and number of revolutions are given in Table III. The next to the last item gives the results of the standardized test with the new apparatus as arranged at present.

Table IV shows the results of the standardized test with the new apparatus upon gravels. For the purpose of comparison and study the gravels were selected from local

"Overland transportation of manufactured products, food-stuffs and other materials by motor trucks will increase immensely as the winter months approach, due to an inevitable shortage of railroad shipping facilities.

"While there was congestion at the terminals and shortage of freight cars last winter, conditions will certainly not be improved during the coming months, because the volume of war supplies to be handled by the railroad will greatly exceed that of a year ago.

"This leaves but one outlet for many shippers—the motor truck. And scores of motor truck routes will be opened during the winter months, of necessity."

Coal by Motor Truck

Fuel Administration Urges Fullest Possible Use of Highway Transportation

The following statement is authorized by the Council of National Defense, Washington, D. C.:

The U. S. Fuel Administrator, through Cyrus Garnsey, Jr., assistant fuel administrator, in endorsing the most extensive and efficient use possible of the highways to the end that the transportation resources of the country be increased, has transmitted to the Highways Transport Committee, Council of National Defense, to which body is delegated all matters dealing with any phase of highways transport, a letter emphasizing the applicability of the committee's program to the problems involved in the expeditions and larger tonnage movement of coal from wagon mines.

TABLE IV.—RESULTS OF THE STANDARDIZED TEST WITH THE NEW APPARATUS ON VARIOUS GRAVELS.
Gravel content, percentage by weight.

Trap	Granite	Quartz	Limestone	Sandstone	Wear, per cent.	
					2,000 Revolutions	4,000 Revolutions
100	0	0	0	0	0.40	1.08
0	100	0	0	0	1.48	2.60
0	0	100	0	0	2.04	3.48
0	0	0	100	0	2.24	4.52
0	0	0	0	100	15.52	28.04
50	5	5	40	0	1.50	2.50
50	5	5	35	5	3.20	4.50
50	5	5	30	10	4.00	5.90
50	5	5	20	20	5.20	9.00
50	5	5	10	30	7.00	10.50
50	5	5	0	40	10.00	14.00
40	5	5	50	0	1.50	2.90
35	5	5	50	5	3.00	5.50
30	5	5	50	10	4.50	7.50
20	5	5	50	20	6.00	9.70
10	5	5	50	30	9.40	14.00
5	5	5	50	40	12.00	17.20
15	5	5	75	0	2.10	3.80
10	5	5	75	5	3.30	5.60
5	5	5	75	10	5.00	8.40
0	5	5	75	15	6.00	9.30
2	2	2	75	19	8.00	10.80

deposits and grouped synthetically as shown. Except where otherwise stated each result is the average of at least three tests.

The apparatus described has been devised at the Laboratory for Testing Materials of Purdue University to fill the need of a rapid and practical abrasion test for road materials of all kinds. The machine is simple in construction and operates upon the right principle by allowing the dust to escape. The tests of stone and gravel reported represent certain local conditions.

Use of the Truck to Increase

Further Development of Highway Transportation Anticipated by Truck Manufacturer

The probability of increased motor truck transportation over the highways during the next few months, which has been pointed out in these columns upon several occasions, is the subject of a recent statement by H. M. Lee, president of the Duplex Truck Co. Mr. Lee says in part:

Mr. Garnsey's letter, addressed to R. C. Hargreaves, Secretary of the Highways Transport Committee, expressing the Fuel Administration's approval of the steps being undertaken by the highways transport body looking to the most effective utilization of highways transportation, continues:

We are also convinced that transportation resources can be greatly increased and larger tonnage movement of coal from wagon mines direct to consumers effected by applying all possible vehicles, horses and the necessary labor in line with national policies promulgated by you, and operating over suitable highways constantly maintained in efficient condition.

For this reason we ask that you convey to our field organization our very real interest in this part of their work and assure them we desire to support their organization to the limit in their efforts to effect greater tonnage movement of coal over the highways from wagon mines to consumer.

We suggest also that whenever conditions of roads, local legislation, lack of suitable equipment, and so forth tend to impede the most effective and efficient movements you will promptly bring these matters to our attention.

To expedite the handling of these questions the Fuel Administration has committed them to its Mine Track Committee composed of Frank G. Jones, Chairman; Robert L. Ireland and S. A. Taylor.

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The New York State Highway Department's service flag has 177 stars, and more are to be added soon.

John E. Brady, of the firm of Brady-Oltarsh Construction Co., New York City and Johnstown, N. Y., is at present with the construction division of the War Department at Washington, D. C.

Jos. McCormick, contractor, of East Providence, R. I., has received the contract for the excavating and grading on the new cantonment being built at Newport, R. I. This contract is to be completed in 40 days and will require 7 or 8 large steam shovels.

At Rochester, N. Y., during the latter part of last month, Commissioner Duffey met with the State Defense Council. He explained the situation on the highways on which it is proposed to establish express lines of trucks. The commissioner held that the highways have stood the tests thus far made and have carried the heavy military trucks easily except in some cases where the older roads were used before the frost was out of the ground. A map will be drawn showing where drifts are most likely to form in winter.

News of the death of Geo. Corliss See, who for many years was connected with the New York State Highway Department as civil engineer, has been received. During the past year Mr. See has had a position as senior highway engineer with the United States office of Public Roads and Rural Engineering at Montgomery, Ala. He was transferred to the Washington office of that bureau, but was enjoying a vacation when he died. Captain Willard See of the Engineer Corps, U. S. A., at Camp Humphreys, Va., is his brother.

Over \$2,000,000 was distributed among the counties of the state during the month of August by the State Comptroller as the annual contribution for the maintenance and repair of town highways. The money was apportioned according to the assessed valuation of the highways per mile, and where this valuation was less than \$5,000, dollar for dollar was paid. Otherwise, the amount was graduated on a fifty-fifty basis where the town was assessed at \$13,000 or more per mile. The actual amount paid out by the state was \$2,041,916.37. In two counties the payment was over \$100,000. These were Nassau and Sullivan Counties.

State Highway Commissioner Edwin Duffey's last detour bulletin was a lengthy one. Many highways in New York State are undergoing repairs at the present time, making detours necessary along most of the main lines of travel. Many other main lines are under reconstruction at present. He calls attention to routes between Albany and New York City, especially on the east side of the Hudson River.

Brown & Lowe, Schenectady contractors who recently built several miles of road at the cantonment at Yaphank, L. I., have undertaken the contract to complete the Schenectady-Duanesburg road. This job has been hanging fire for the past four years. The road is about 5½ mi. long and almost all of it has been graded and covered with a sub-base. The road will be of 3-course construction, running from South Schenectady just beyond the new Government warehouses to Duanesburg.

John J. Coleman, of the Albany Division Engineer's office, has been appointed one of the directors of the State Department Bowling League, representing the New York State Highway Department. Every member of the league has placed patriotism before bowling and last spring at the close of the season all of the prize money was given to the Albany war chest. A considerable sum of money which was in the treasury at the time was donated for other war projects. The season will open this year on Sept. 25 and close on April 9.

High estimates for the month of August, 1918, which were reported at the New York State Highway Department: Nathan E. Young, repair contract No. 1,093, Broome County, \$16,213.63; Jos. Walker Construction Co., repair contract No. 1,164, Monroe and Ontario Counties, \$11,448.45; Richard Hopkins, repair contract No. 1,045, Saratoga County, \$10,384.25; S. B. Van Wagenen, road contract No. 1,100, Hamilton County, \$6,577.20; Greenfield Construction Co., repair contract No. 1,159, Ontario County, \$5,057.36; John H. Gordon, Messrs. Spellman-Oliver Co., Hendrickson-McCabe, Fred E. Ellis, William G. Fox, Paddelford & King, Antonio Colorusso, William Thayer and Arthur McConville show by their estimates that they surely were not slackers. The weather has been ideal and has helped the boys out to a large extent.

The awarding of the contracts on the letting of Aug. 12, has been more or less delayed on account of the mandamus proceedings brought by the National Surety Co. of New York City. This was done to prevent the Highway Commission from awarding contracts for the completion of work abandoned on account of the war. On Aug. 15, the repair contract awards were made to Harry W. Roberts & Co., Warren Bros. Co., and Thos. F. Murray. On Aug. 24, three of the construction contracts were awarded to S. B. Van Wagenen, Jos. Walker Construction Co., and Charles R. Wilde, Jr. A court test was held on Aug. 24, and the result of this test was that up to the present time nothing has been done with the five roads in Erie, Monroe, Nassau and Westchester Counties, and probably nothing will be done with them until the court renders the decision in the test case which was brought by the New York State Road Builders' Association against the Highway Department in the case of Geo. H. McEvoy. This decision is expected this month.

Massachusetts Highway Association

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Announcement

This section of the paper is open to members of the Massachusetts Highway Association for the discussion of matters directly connected with road interests. Members are requested to submit items of interest for use in this column.

Address all communications to GOOD ROADS, P. O. Box 2705, Boston.

The following notice is of the utmost importance to all highway officials and should be carefully considered and acted upon promptly:

"The National Highways Council will shortly begin, in cooperation with the office of Public Roads of the Department of Agriculture, and the state highway departments of several states, the preparation of a program of road and street construction, reconstruction and maintenance throughout the United States for the working season of 1919. The purpose of the program is to obtain an approximation of the character and amount of street and highway work deemed essential in 1919, together with an approximation of the amount and character of financing required, the amount and character of the various materials entering into the work, the extent to which rail and water transportation will be involved, and the probable demands upon the labor supply. The preparation of the program in each state will be directed by the state highway department, and will cover all state, county, township and municipal highway and street work."

Form H. C.-3, Bureau of Public Roads, U. S. Dept. of Agriculture, should be used in compiling these data, these forms obtainable from the U. S. Highways Council, Willard Building, Washington, D. C.

The date set for the return of these forms to the State Highway Commission was October 20th, but we understand this time has been extended to Dec. 1st.

After many unsuccessful attempts to settle the strike of the highway department laborers, the Waltham Chamber of Commerce requested George E. Stuart, Street Commissioner of the city of Newton to act in the capacity of arbitrator.

Mr. Stuart is widely known as an expert in municipal government, having been employed in a supervisory way for about forty years in the Newton Street Department; the last five years as Street Commissioner; twenty-three years previous as Deputy Street Commissioner, and twelve years as Division Foreman. He is a past president of the Massachusetts Highway Association and past member of its board of directors, and also a member of the Boston Society of Civil Engineers, and he proved to be the right man for the emergency. The following details of the controversy are interesting.

On the report of City Manager Bingham of Waltham he had on the street department payrolls 106 laborers, 43 receiving \$3.00 per day and the rest higher rates.

Several weeks ago 62 of these men struck and through the efforts of Mr. Stuart the matter has now been adjusted to the satisfaction of all concerned.

The men wanted a flat raise of 25 cents a day to apply to all workmen and teamsters. They also asked to have this increase dated back to August 1st, and insisted that all strikers be reinstated. The settlement as arranged by Mr. Stuart and accepted by all parties, fixed a minimum rate of \$3.25, which gave the \$3.00 men an increase but no other advances were granted. The raise was not retroactive, and no promises were made to reinstate the men who went out; they are to be taken back when work can be found for them, the older men to be given the preference.

Mr. Stuart was invited to act Wednesday, Sept. 11th, his report was made on Friday and the men went back to work on Monday, the 16th.

Contract for building streets and sidewalks in connection with the United States Housing Corporation's plan to build 256 dwellings for shipworkers at Quincy has been awarded to Dennis F. Crowley, who bid \$161,523 and has agreed to do the work in ninety days. Two miles of streets, including sewers and water pipe trenches, and 88,000 square feet of granolithic sidewalks, are called for in the contract. It is planned to begin the work Monday morning. Crowley's bid was higher by \$2,000 than that of the lowest bidder, who, however, specified 270 days for the work.

Commissioner of Public Works Sullivan of Boston, Mass., recently met with the determined opposition of the Boston Finance Commission in the matter of a new pavement on lower State St. The proposed work is to cost \$34,666.60, which is estimated to be \$12,000 above normal pre-war prices. The commission maintains that money, labor and materials should be conserved at this time and that the condition of the present surface does not warrant the rebuilding of the street.

Commissioner Murphy calls attention to the mud splashed on the store windows after each rainstorm and also calls attention to the fact that this work was approved by the advisory committee recently appointed by Mayor Peters to make recommendations regarding the new paving required in the city.

The commissioner believed the report of the Finance Commission ill-founded, and decided to proceed at once with the award of the contract.

All such questions will hereafter be decided by the United States Government through the Highway Committee, whose authority over all road construction began on September 10.

A move has been made to boost the salary of the mayor of Worcester to \$5,000, an increase of \$1,000. The proposition will come up at a meeting of the Finance Committee of the City Council, and the chances that it will be recommended are bright.

The mayor has said that it costs him more to be mayor for a year than his salary amounts to.

After Sept. 1 Boston hotels, restaurants and stores will be obliged to pay 11 ct. per bbl. for the removal of garbage by the city teams. These industries have always claimed that the old rate of 7 ct. per bbl., which has been in force since 1911, was too high, and they have had an unpleasant

surprise. They know now how the hotel customer feels when he orders a ham sandwich and gets a check for 70 ct.

The sale of garbage tickets yields the city about \$60,000 annually. If it were not for the private contracts entered into by the hotels and larger restaurants for garbage disposal the city receipts would be more than \$150,000 yearly. This is purely commercial waste that the city charges for removal. Household waste is removed free of charge.

Possibility of strikes among the employees of the Metropolitan Water and Sewerage Board working at the reservoirs supplying Boston with water has led the members of the board to call upon the governor for relief. Should the employees quit work the situation relative to fire protection and water supply would be threatening.

"Resignations" of 19 men employed at the Chestnut Hill pumping station were handed in to the board on Sept. 4. This action followed failure of the men to secure an increase in pay. Immediately the board took steps to meet the labor shortage. It secured volunteers from among the other workers, who agreed to work overtime. It also secured a few men to step into the places vacated by those who "resigned."

The labor situation is still serious. More men are needed. Those now employed are asking for more money on account of the high cost of living. They point to the high wages in industries and plants turning out war material, and declare that many state employees received increases last year from the Legislature.

The Metropolitan Water and Sewerage Board is dependent upon an annual appropriation from the Legislature, and has no money at present to provide for any wage increases. It has agreed to bring the matter to the attention of the next Legislature.

A Boston paper prints the following paragraph:

"Talking with the wife of a Boston contractor, whose husband does road and tennis court work, she told me she has always made out the weekly payroll for his employees. Last year a man operating a steam roller received as his weekly wage \$30. Last week she made out the payroll, which included a payment of \$96 to this same man for this week's work."

Out of the recent threatened strike of Boston firemen, which Mayor Peters so happily settled, has arisen a situation that may compel him to provide salary increases for all classes of city workers that may total \$1,000,000. Daily this week delegations representing these employees have called upon Mr. Peters, seeking for themselves the same promise he made to the firemen—that he would do his best in framing the next budget to see that they get advances in wages that will better enable them domestically to "make both ends meet."

Arthur A. Adams, an ex-president of the M. H. A., and former Superintendent of Streets of Springfield, has announced that he will be a candidate for the Republican nomination for mayor of Springfield.

This came about as the result of a petition signed by many well-known Springfield men, asking that he be a candidate. It was presented to him several days ago, and since then many other citizens have expressed a desire to add their request that he should run.

We wish Mr. Adams success in his undertaking.

The receipts of the automobile department of the Massachusetts Highway Commission for the year ending Aug. 31 were \$2,065,405, or about \$100,000 more than the receipts of 1917. These receipts are principally obtained from auto-

mobile registration fees. During the year 151,818 passenger vehicles were registered as against 136,417 in 1917, a gain of 11%, and 31,649 commercial cars were registered as against 24,025 in 1917, a gain of 32%.

Wakefield's tax rate this year has been placed at \$26.50 by the town assessors, an increase of \$2.10 over last year's rate, which was \$1.20 higher than in 1916. The higher rate is attributed by the assessors partly to the increase in district taxes, including the county and metropolitan park assessments, the total for such purposes amounting to \$31,762. To offset this it would have been necessary, according to the assessors, to obtain revenue on \$1,500,000 new valuation. The increase in valuation amounted to only \$388,216, however, and this was mostly on personal property. There was a falling off in building operations owing to war causes. The total valuation of the town is placed at \$13,142,007, of which \$10,689,598 is real estate and \$2,452,409 personal. The net tax levy for 1918 is \$341,822.99.

The light and water departments of Wakefield are owned by the town, and the assessors take occasion to say that if these were operated under private ownership the taxes accruing to the town and the release from the burden of the debt contracted by their purchase would serve to bring the tax rate down to approximately \$20. The assessors say also that the town has taken over too much property on tax titles.

Among various matters discussed at the last meeting of the Salem City Council was that of establishing a municipal coal and wood yard to provide against a shortage for the poor. This was referred to a special committee to investigate and report at the next meeting. Bond issues of \$70,000 to meet the cost of reconstruction of Essex Bridge and \$22,000 for additional water supply were authorized. The committee on salaries and wages reported a schedule of a general increase of \$100 a year on practically all salaries, 50 ct. a day for patrolmen, 25 ct. increase for laborers in all departments, the increases aggregating \$52,677 for the full year, or \$23,091 for the balance of the present municipal year. This makes an addition of \$1.25 on a thousand of the tax rate per year. The schedule was accepted and passed to be advertised.

A motion to increase the pay of common laborers to \$3.50 per day failed of passage by a single vote with two members absent.

Announcement has been made by the Salem assessors that the city's tax rate this year has been fixed at \$26.50, which represents an increase of about \$1.75 over the rate last year.

The Board of Aldermen of Somerville has adopted a resolution presented by Alderman J. J. Pincuf to name new streets and rename others in memory of soldiers killed on the battlefield.

Arthur E. Seagrave of Uxbridge filed a petition in the Supreme Court yesterday, asking for a writ of mandamus to compel Thomas Carmody, tree warden of the town, to permit him to cut down 100 large trees for fuel. The trees are on the petitioner's property, but their branches shade the highway.

Last June Carmody gave a hearing on the application for leave to cut down the trees, but has made no order.

Contrary to expectation there will be no increase in the tax rate of Melrose for 1918. It will remain \$23.40, last

(Continued on page 115)

New Hampshire Good Roads Association

OFFICERS FOR 1918

CHARLES A. FRENCH, President.....Laconia
 F. E. EVERETT, First Vice President.....Concord
 W. M. CHAPLIN, Second Vice President.....Keene
 GEORGE P. WINN, Secretary and Treasurer.....Nashua

Board of Directors

O. F. WINSLOW.....Nashua
 C. M. BROOKS.....Keene
 H. L. SMITH.....Lakeport
 ALFRED CLARK.....Concord

The regular quarterly meeting of the New Hampshire Good Roads Association will be held at Lebanon on Thursday, September 19; as we go to press. A full account of the meeting will be printed in this column in our October issue.

They have had considerable trouble in Manchester trying to determine whether or not the resolution approved by the board of mayor and aldermen on Aug. 9, authorizing the issue of \$135,000 of municipal bonds, will be favorably passed upon by Ropes, Gray, Boyden & Perkins, of Boston, attorneys for the Manchester Safety Deposit & Trust Company, through which subsidiary financial organization of the Manchester bank, the city of Manchester has transacted its bond business for a number of years.

This fact accomplished, the municipality must still pass muster before the Capital Issues Committee of the Federal Reserve, whose duty it is to determine the expediency and character of all bond issues in excess of \$100,000.

If the Boston attorneys place their O. K. on the \$135,000 bond issue and the U. S. Government officials do likewise, a lot of new street improvements in this town will be carried out and the new Isolation Hospital will be equipped and opened to receive patients. Right now these public improvements are at a standstill.

Undoubtedly the hitch in the proceedings at city hall arises over the question of the legality of the bond issue. The city ordinances provide that a two-thirds vote of the city councils is necessary to pass a resolution involving a temporary loan or a bond issue. As elected and sworn in the present board of aldermen has a membership of 13. Illness and absence from the city of Mayor Verette has occasioned the selection by vote of the aldermen of Alderman Corbin as acting mayor. Thus arises this problem, an answer to which is daily expected.

Is the membership automatically reduced to 12 by the election of Alderman Corbin as acting mayor?

If so, eight members of the board constitute a legal two-thirds representation. Otherwise, if Mr. Corbin is still classed as an alderman, nine votes are required to create a vote of two-thirds.

When the bond issue was approved, the vote stood 8 to 4 in favor of its adoption. For about three weeks, the city's temporary loan bill was held up until its legal status officially was decided upon. In its case, it was ruled that a two-thirds vote of the aldermen present and voting was sufficient to determine the question and the temporary loan bill passed. That there is at present the suggestion of a cloud on the title of the last bond issue of the city is conceded by the city's public servants, and they are anxiously awaiting the decision of the Boston law firm and the federal reserve committee.

City Solicitor Madigan has worked zealously to have the title of the bond issue indorsed by the proper authorities, but, like all other officials associated with the present administration, he must await developments.

Capt. E. S. Warner, of the 301st Engineers and one of the speakers at the last meeting of the Association in Keene, is now in France with the 76th division.

The town of Charlestown is building a new 35-foot span concrete beam bridge at North Charlestown to replace a steel bridge recently smashed and rendered unsafe by a large road tar application motor truck running into and breaking the truss.

The town of Swanzy has contracted for a new 60-ft. span steel bridge with the United Construction Company and erection of the new bridge will soon begin.

City Treasurer Russell Badger of Portsmouth has been called for service in the National Army and has left to join the limited service men for Camp Upton, New York.

Hon. Clarence E. Carr of Andover has resigned his position as federal director of the Public Service Reserve in New Hampshire and the work of his department will be coordinated with that of the U. S. Employment Service, both being in charge of Federal Director Enos K. Sawyer of Franklin. This is in line with the policy of the federal department and is in operation in most of the other states, which is the reason Mr. Carr gives for his retirement. Mr. Carr expresses his approval of such consolidation of the work.

Acting Mayor William O. Corbin of Manchester has decided to remove all of the shade trees on Elm street, from Hanover street to Spring street, for the reason that the trees are unable to receive proper nourishment and are gradually decaying and becoming a menace to the traffic. It is considered as another step towards giving Elm street a more metropolitan aspect.

When the paving stones were laid in Elm street, the shade trees were considered a hindrance to traffic and many were removed. In later years, more trees died and were subsequently cut down. As much as possible the trees were spared and, in the sections of Elm street away from the down town districts, the growths are thick.

There are a half dozen trees in the zone which will be cleared, on either side of Elm street. The work will begin immediately.

There is a probability, however, that all of them will not be cut, as Judge N. P. Hunt, who has charge of Patten's block for the John J. Bell heirs, has notified the street department not to remove the elm trees in front of this block located near the corner of Elm and Stark street.

The judge is greatly opposed to the removal of the shade trees on Elm street, maintaining that the city once appropriated money during the administration as mayor of Frederick Smyth, for setting out the trees, and that the trees are the joint property of the city and the abutters and that without the consent of the latter, they cannot be removed.

It is likely that the Patten's block elm will be like the historic "Lone Pine" at Hanover, the seat of Dartmouth college, the only one remaining on Elm street, when the tree crusade is over.

Mr. G. P. Winn, City Engineer, Nashua, N. H., Secretary of N. H. G. R. A., has resigned as secretary as he has accepted a position as cost engineer with the U. S. Housing Corporation and begins his duties soon.

Mr. C. A. French, City Engineer of Laconia, N. H., President of the Association, has been appointed captain in the Construction Division of the army and has been granted a leave of absence by the city government of Laconia.

As the regular meeting of the Association came Sept. 12, which was registration day, the meeting was postponed until Sept. 19. This meeting will be held at Lebanon, N. H., and includes a trip to Hanover and Dartmouth College, where the military camp of the college will be inspected. The Association will be addressed by Capt. Max Patterson, who is in charge of the camp.

The Street Department of Laconia has found it difficult to secure U. S. permits for materials for new construction, but has been successful in getting permits for materials used in maintenance work. The labor shortage is proving a great handicap and it has been found necessary to raise wages three times during the past year. We are now paying laborers \$3.00 to \$3.50 per day, double teams \$6.50 and skilled laborers and operatives from \$3.75 to \$5.00 per day.

The debt of the city of Manchester has been reduced by \$20,000 through the payment of \$5,000 bridge and sewer bonds, \$5,000 school bonds, and \$10,000 permanent improvement bonds.

The principal items in the August city draft included expenses of the water works, \$14,842.99; transportation, equipment and supplies of the public works department, \$11,652.23; maintenance of highways, \$12,903.70; fire department, \$11,691.93; interest, \$6,719; street cleaning, \$7,396.81; new highways, \$1,632.15, and maintenance of playgrounds, \$1,111.99.

Director Enos K. Sawyer, of the U. S. Employment Service, recently held a meeting in the city hall at Nashua to call attention to the serious conditions brought about by the shortage of labor necessary for the production of war supplies.

The Government plans to have one main employment office and eleven branches in the state. National Field Organizer D. T. O'Connell explained the urgency of the situation by stating that during next year 25,000,000 will be required for war work and the total labor available in the U. S. is estimated at not over 35,000,000, so it will be necessary to draw a sharp line on non-essential industries and every branch of trade and every activity not connected with war production will be curtailed or shut down to provide the necessary men.

The speakers at the meeting suggested that it will soon be time for the women to take an active part in the production of supplies.

The Highways Council in Washington is now in complete control of all road building and with the constantly increasing demands for labor for war materials it is practically certain that all road work will be restricted from now until the end of the war.

September 2nd was a great day for Sunapee and a combination celebration was held by the townspeople in observance of Labor Day and the 150th anniversary of the incorporation of the town. In addition to this it was Old Home Week.

In division 4 two rodmen, Carl H. Dodge and Claude F. Mason, are in the army. Also three state road patrolmen, Howard L. Baird, Robert B. Chase and Leon E. Amidon.

The annual Field Day of the State Road Patrolmen's Association in division 4 was held at Keene, Sept. 10th.

Demonstrations of maintenance methods, a clambake and speaking by State Highway Commissioner Everett, State Motor Vehicle Commissioner Chase, and Mr. Harry Roberts were features of the day.

Mr. Roberts is a British exchanged prisoner of war, who has seen three years' service in Belgium and France, been wounded twice, gassed, and before being exchanged spent seven months in German hospitals and prison camps. He is now employed in maintenance work for the State Highway Department.

On account of the inability to secure road oils and tars considerable heavy resurfacing has been done on the gravel roads this season in Division 4. A fleet of six motor trucks has handled this work satisfactorily and economically.

The N. H. Highway Department has several patrolmen using Ford 1½-ton "Form-a-trucks" on their regular work this year. By using one of these machines attached to a three-bladed drag exceptionally good work can be done on a gravel surface.

The federal aid project in Marlborough is progressing, the gravel section being completed and the bituminous macadam section now being laid.

Massachusetts Highway Association

(Continued from page 113)

year's rate. There has been less than \$200,000 in new construction as against \$500,000 to \$700,000 in normal years.

We take pleasure in printing the following extract from the Cambridge Chronicle:

James A. Ferguson, Superintendent of Streets, has resigned his position to accept a commission as first lieutenant in the Quartermaster Corps, and left Cambridge Wednesday afternoon for Newport News, Va., where he was ordered by telegraph on Tuesday to report immediately.

Mr. Ferguson has spent 28 years in the Street Department of the city, a greater part of the time as a division foreman and the last two years as superintendent, an appointment made by Mayor Rockwood.



1st Lieut. Jas. A. Ferguson,
U. S. Q. M. C.

Mr. Ferguson expects to be given a position either in the engineering department or as stevedore. After studying nights at Northeastern College for four years for a degree in civil engineering he graduated last June with the coveted prize. This unquestionably helped him in securing his commission. Mr. Ferguson is 54 years of age, and it is quite unusual for a man of that age to win a position in the army.

Mr. Ferguson was born in the Provinces. He is a widower with four daughters and two sons. One daughter is the wife of Lieutenant Harry E. Warren, who is in the service at Washington. Another daughter is the wife of Captain Robert E. Phillips, also in the service. A third daughter is a stenographer in the federal employ at Washington, and a fourth daughter is employed at the Widener library. One son, Roy, is serving with the 23d Engineers in France, and the other son, Milton, is afflicted with blindness. A younger brother, Lieutenant Melvin D. Ferguson, is in the U. S. aviation service, stationed at San Antonio, Tex.

Mr. Ferguson expects to spend the next two months in a training school before being sent overseas.

The telegram received by Mr. Ferguson, notifying him of his appointment and containing orders, was as follows:

"You are appointed first Lieutenant Quartermaster Corps. With acceptance, giving full name and rank and proceed immediately to Newport News, Va., reporting to commanding general, port of embarkation, for duty with labor organizations. Uniforms and necessary equipment obtainable at Newport News."

Wednesday forenoon Mr. Ferguson's associates at City Hall gathered in the mayor's office, where, acting in their behalf, Mayor Quinn presented him with a wrist watch. Although choked with emotion Mr. Ferguson managed to express his appreciation of the remembrance, which he said would ever keep in mind his friends at the hall.

The following correspondence passed between Superintendent Ferguson and Mayor Quinn in relation to the former's resignation:

City of Cambridge, Mass.
Office of Supt. of Streets,
August 21, 1918.

Hon. Edward W. Quinn, Mayor.
Dear Sir:

I desire at this time to tender my resignation as Superintendent of Streets of Cambridge for the reason that I have been commissioned a first lieutenant in the United States Army and have orders to report at once.

This resignation will take effect according to our agreement on the first day of September, 1918.

I must take this occasion to express my appreciation of the many courtesies extended me and the good feeling that has existed between us during our connection with the city's service.

Very truly yours,

JAMES A. FERGUSON.

Superintendent of Streets.

Office of the Mayor,
Cambridge, Mass.,
August 22, 1918.

Mr. James A. Ferguson,
Superintendent of Streets.
Dear Mr. Ferguson:

I am in receipt of your letter of Aug. 21 current, tendering your resignation as Superintendent of Streets of this city, to take effect on Sept. 1, 1918, for the reason that you have been commissioned a first lieutenant in the army, with orders to report at once.

I hereby accept your resignation and desire to express to you my personal appreciation of the efficient manner in which you have filled your position, which I know is the sentiment of all who know you, and to wish for you in your new and responsible position the very best of good fortune and success.

With kind regards, I remain

Yours very truly,

EDWARD A. QUINN,
Mayor.

Superintendent of Streets John D. Devir of Malden has been commissioned a second lieutenant in the Quartermaster's Department, and has reported at Newport News for subsequent overseas service.

The street commission, at a recent meeting, gave Mr. Devir a six months' leave of absence and at the same time

appointed John A. Carter, general foreman of the water works, now drawing \$4.25 a day, acting superintendent of streets at Devir's salary—\$2,300 a year.

In behalf of clerks and officials at City Hall, City Clerk Holden presented Superintendent Devir with a fine wrist watch and a quantity of cigarettes. The presentation took place in the offices of the Street Commission much to the surprise of the retiring superintendent.

Mr. Devir was made Superintendent of Streets during the Schumaker administration and held office during



2d Lieut. J. D. Devir,
U. S. Q. M. C.

the balance of that administration, the Blakeley and Blodgett administrations. He had previous experience with Coleman

Bros. and other big contractors. Superintendent Devir is the son of ex-Alderman John M. Devir of Ward 2, who was formerly on the Street Commission as an appointee of Mayor Farrell.

Lieut. Devir was very popular with his men, and they presented him with \$130 in gold as a token of their friendly feeling.

He expects to go overseas shortly, and we wish him the best possible success with war crosses and all the rest of the honors that are given to good soldiers.

The American Tar Company wishes us to announce that Mr. W. C. H. Stevenson, recently Superintendent of Streets of Reading, will fill the position formerly held by Mr. J. E. McGuire during the latter's term of service in the United States Army.

A reduction of \$1.40 in the tax rate, from \$19.80 to \$18.40 per thousand, is announced by the Newton Board of Assessors for 1918. Increased receipts from the income tax and the completion of much building that was started in 1916 are the principal reasons for the decrease.

Medford's tax rate for 1918, announced yesterday by the assessors, will be \$22.60, which is in excess of that of last year by \$1.20. The total cost of running the municipal departments of the city is estimated at \$718,258.75, while the entire levy to be raised by taxation is \$884,504.53.

MEETINGS

Calendar of Coming Meetings

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

PERSONAL MENTION

W. G. Thompson, State Highway Engineer of New Jersey, has been granted leave of absence for the duration of the war and will enter the service in the Engineer Corps.

Louis Guerringer, C. E., has been appointed by the Texas State Highway Commission as engineer of the El Paso district. Mr. Guerringer's appointment will be effective October 1st.

James P. Nash has been appointed office engineer of the Texas State Highway Department. Mr. Nash has for several years past been testing engineer at the University of Texas. His appointment will be effective October 1st.

Edward E. Reed, Assistant State Highway Engineer of New Jersey, will be the acting head of the State Highway Department during the absence of State Highway Engineer W. G. Thompson, who has been given leave for the duration of the war.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, SEPTEMBER 28, 1918

Number
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Concrete and Steel Bridges^{*}

Types Used in Highway Work and Data on the Methods of Construction and Maintenance

By JOHN W. TOWLE†

The first impression, favorable or unfavorable, that a stranger receives from his visit into a new country comes from the highways.

It is almost axiomatic that the transportation system of any community is the one best indication of the prosperity and the progressiveness of its citizens.

Good highways and lines of communication are, and always have been, a necessary adjunct to the welfare of the state, community and individual.

The old argument, "good roads cost lots of money," is true only when you consider the original expense, but is in reality incorrect, because the roads pay for themselves almost yearly. The greater efficiency of animal and motive power, the increased

loads, the less number of trips, the saving of men's time, the pleasure and satisfaction of travel—to say nothing of the lessening wear on teams and autos and breakage of harness, vehicles and cars—all contribute to this end.

Did it ever occur to you the terrible toll the old cobblestone pavement took from the traffic that passed constantly over it?

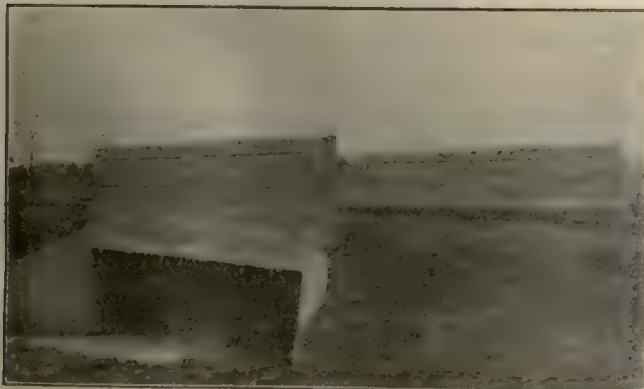
Then there are the wet days that are saved when the farmer cannot work in his fields, which he can use in the transportation of his crops and supplies. But if you have only the natural roadways, they are impassable at the same times when the fields cannot be entered.

In plain English, if you build these good highways they pay for themselves, and if you do not, you pay for them in other ways without having them; in short, good roads cost nothing.

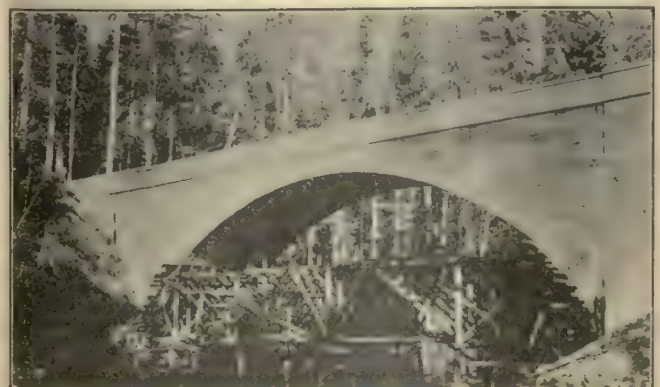
The line of defense in battle is no stronger than



A Steel Structure at Washington, D. C.



A Reinforced Concrete Slab Bridge in Iowa



A Concrete Arch in the State of Washington

EXAMPLES OF MODERN HIGHWAY BRIDGES OF LEADING TYPES.

^{*}Paper presented at the annual convention of the North Carolina Good Roads Association, Wrightsville Beach, Wilmington, N. C., Aug. 7-9, 1918.
[†]Emergency Fleet Corporation.

its weakest sector; the length of a railroad train is limited by the steepest grades; so the utility of a highway is dependent upon its individual sections and parts.

There is, in my judgment, no portion of a transportation system—be it highway, railroad or trolley—more important than the bridges which carry you safely over the streams. Like roads, they soon pay for themselves if you have them, and the community pays for them anyway, if you do not have them, for the cost of one bad accident at a defective bridge will properly rebuild not only that bridge but several others beside.

The pioneer, because of his lack of numbers and scarcity of funds, had to be satisfied with fords. Later on, as the community developed they were able to have a few log crossings. With the advent of sawmills and the railroads, wooden bridges, built of sawed timbers and plank, were constructed. Today there are, however, but two generally accepted types of bridges that are suitable for permanent highways, and they are constructed of concrete and of steel.

The decision as to which of these two is best adapted to a given location is at times difficult to make, and is largely a matter of judgment. In a general way, however, the shorter spans should be built of concrete, and the longer ones of steel, leaving the lengths between 24 and 60 ft. to be determined by individual conditions.

Concrete Bridges.

Superstructures.—There are three general types of concrete superstructure:

- (1) The flat slab or box culvert for short spans.
- (2) The girder, having two or more heavy stringers running lengthwise, for the middle lengths.
- (3) The circular or elliptical arch, for the longer bridges.

1.—The first type consists of a flat slab of concrete extending the full width of the bridge or culvert, having a thickness usually from 6 to 12 in. depending upon the distance the supports are apart. Running parallel with the roadway and stretching from foundation to foundation is a series of reinforcement bars $\frac{1}{2}$ to 1 in. thick, usually 6 in. on centers, and placed about 2 in. from the bottom of the slab. These are supplemented with other reinforcement bars of smaller sizes at right angles, thus making a network of steel to tie the concrete together and to give the tensile strength necessary to carry the loads. The slab construction is rarely ever used in bridges over 16 ft. in length.

2.—The girder concrete span usually has from two to four stringers running lengthwise of the bridge. Each girder has a width of from 10 to 14 in., and a depth of from 12 to 36 in., depending upon the length of the span, number of stringers, and capacity for which the bridge is designed. For the floor system a slab of concrete covers the entire bridge, resting on the stringers. The girders must be strongly reinforced near the under side with heavy steel rods from $\frac{3}{4}$ to $1\frac{1}{2}$ in. in size and in numbers sufficient to give the necessary tensile strength. This style of span can successfully be constructed up to lengths of 40 ft.

3.—The arch is the natural type for concrete bridges, and is a modern development of the old-time arch that has been used for many centuries. By the proper use of reinforcing steel the quantity of material necessary can be greatly reduced and greater safety insured. It is desirable to have arches designed as nearly a half circle or a half ellipse as the height of the bridge will permit. The arches have a varying thickness at the center of 10 to 12 in., and at the ends of about 14 to 18 in., depending upon the length of the span, rise of arch and strength desired. In many cases the arches consist of individual and separated girders, connected together over the top with a thin floor slab. At the sides of the bridge and above the arch are the spandrel walls which hold the fill and pavement in place and form the base for the hand-rail.

This style for the ordinary highway bridge usually runs from 40 to 60 ft., and in exceptional cases has been built up to 200. One arch over the Spokane River in Spokane, Wash., has a length of 350 ft.

One of the great advantages of the concrete bridge is that it has more or less of a fill over the span and permits of a continuous roadway pavement. What a feeling of satisfaction in touring, when coasting down a hill, to know upon reaching the bottom you will not have to slow up in fear of a mudhole or a bump.

Foundations.—As in all engineering structures, the foundation is of the most vital importance. The slightest settlement in a concrete span spells disaster. I have in mind one long bridge over the Illinois River at Peoria where a settlement occurred in one pier. It caused a failure of an adjoining span. The pier being relieved of the balancing end-thrust was pushed out of line, causing the failure of the next span, and so on, one at a time, they fell into the river, making the complete destruction of a million-dollar structure.

A thorough test of the underlying strata must be made before an intelligent opinion can be formed as to the foundation necessary. A bed of gravel, a layer of hard, dry clay or a stratum of shale or rock, will usually suffice. This can be easily reached, if below water, with the aid of a coffer dam built of boards or plank properly lapped. After the bed is thoroughly cleaned of all loose and soft material, the footings of concrete are poured.

Should the desired location for the bridge bring the supports where there are no solid strata, it becomes necessary to make an artificial foundation and this is most commonly done by driving wooden, concrete or steel piling. The length and number are determined by driving tests and computing with engineering formulas, having as known quantities the weight in tons of the structure itself and the desired capacity for which it has been designed.

In some of the longer spans where special cases seem to demand, steel tubes from 6 to 12 ft. in diameter are sunk to a firm foundation and filled with piling and concrete.

Wings and Spandrels.—Next of importance to the foundations and the superstructures of concrete bridges are the wings and spandrel walls. When properly designed and constructed they retain the fill over the span and in the approaches, making it possible to have a solid roadway of full width up to and over the entire structure. The place of greatest danger about a bridge is always at the approach, and this gives us a further reason why these parts should have special attention.

Upon the top of the spandrel walls is built the railing. This can be of varying form and material to suit the artistic demands of the community.

The mixtures for the different parts of the bridge can be varied somewhat if you take into consideration only the strength desired. It is the best practice, however, that if by the addition of a small amount of cement a more permanent and lasting concrete can be made, it should be added. It is false economy not to go to this small extra expense in outside concrete work.

The superstructure—the slab, the girders and the arch—take the greater strains, and should have, perhaps, the richest mixtures, the standard being for them, 1 part cement, 2 parts sand and 4 parts stone or washed gravel. The wings and spandrel walls, acting as they do more as retaining walls, should have a mixture not weaker than $1\frac{1}{2}:4\frac{1}{2}$. The mass concrete in the foundations where even less strength is required, can have the proportions of 1:3:5.

Waterway.—Quite often when streams are shallow and their banks low and the roadway but a few feet above the surrounding land, it becomes quite a problem to get the necessary waterway. The arch type must have a considerable rise in order to attain full strength. The girder presents

(Continued on page 120)

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

E. L. POWERS
Editor

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Managing Editor

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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ILL-ADVISED ECONOMIZING

What would be saved by postponing all new road construction until after the war?

"Nothing" is an inadequate answer. Considerably less than nothing—a minus quantity, in other words—would express the "saving" truthfully, for any such drastic action would entail an ultimate loss far greater than any apparent saving that would be effected in the immediate expenditure of money or its equivalent in labor and material.

The truth of the foregoing ought to be obvious to anyone, but it apparently is not. For instance, not long ago a metropolitan newspaper, ordinarily notable for the sound sense of its editorial utterances, had this to say apropos of the necessity for economizing:

"Without attempting to gauge the size of the heads of economy let us set down the chief ones. New industrial and public construction can be put off for years before the cumulative discomfort grows punitively severe. Public works, roads, rail and waterways, mineral prospecting and preliminary construction, the erection of industrial plants, water powers, electric systems and the like run normally to several billions of constructive work annually."

The term "new construction" as applied to road building admits of several interpretations. If in the paragraph just quoted it refers to entirely new work—the building of roads where none existed before—the contention is partly right, but only partly. If, on the other hand, it is used in the ordinary sense, that is, to indicate the transformation of an unimproved country road to an improved highway capable of carrying modern commercial traffic, the statement is typical of those so frequently emanating from a complete lack of appreciation of the nations' vital need of roads to take care of the ever growing volume of highway transportation.

Among all the incidental work which America has got to do to win this war, there is not one thing so necessary as providing for the transportation of war supplies and the necessities of every-day civil life.

Commodities of various kinds—food, fuel, raw materials and manufactured products—are the lifeblood of the nation's industrial and commercial life. Roadways, railways

and waterways are the arteries that make possible free circulation, and without them neither progress in peace nor success in war could be achieved. And roadways are the most important of the three, for they are the primary, fundamental ways of communication. Railways and waterways have been the most economical for the long haul, but they have been dependent upon the highways. They are still dependent upon the highways and are even yielding to them no small part of their long-haul traffic. Highways, on the contrary, could take care of all transportation in an emergency; indeed, have taken and are taking more and more of the burden of the railroads.

There is admittedly need for curtailing certain road and street work and the provisions made for effecting that curtailment are quite sufficient. But there is no need for putting a stop to all "new construction" in the highway field. Many such projects can be undertaken without detriment to the national interest. Many ought to be undertaken without delay and at almost any cost for the advantage of the nation in the present emergency.

And we have faith to believe that with the experience of our allies in mind, necessary highway work will not only suffer no curtailment, but will be speeded up to meet the demands of the national crisis.

BUY LIBERTY BONDS

A campaign for floating the fourth issue of Liberty Bonds begins today. Once more the Americans who stay at home are given the opportunity to serve—to help their country and themselves. To buy bonds—all that we can buy—is the duty and privilege of every one of us. Let us do it.

Conditions now are very different from what they were when the third issue was made. At that time the Germans had succeeded in driving back the Allies and were menacing Paris for the second time. Now the Hun is on the run. In April of this year the American army had hardly begun to fight. Now it has increased to formidable proportions and has proven its mettle. When the United States put out the third series of bonds it was to provide funds for preparation. The bonds now offered will raise funds to carry on a victorious advance that has been well begun. Last spring the Central Powers were still arrogant; still claiming victory and predicting greater successes. Today they are less assured, less loud in their boasts of a final triumph.

At present the initiative lies with the Allies. It must be kept with them. The man power of Germany is waning; that of the Allies is increasing, chiefly by the constant additions to the American army—a force that, man for man, is so far superior to anything that Germany can put into the field that there is no comparison. Germany and its vassal states are beginning to suffer acutely from the lack of material resources, while America has gone a long way in mobilizing her resources and her industries and is ready to apply "force without stint" until the end.

But though some of even the most conservative believe that final victory is not far off, it must be remembered that the end is not yet. The war is still being fought on French and Belgian soil. It must be carried to Germany. The German people seemingly still have the "will to win." That will must be broken.

There is not now, and there never has been, the least doubt as to the outcome of the war—except perhaps in Germany. We shall win, and the victory will be decisive. But we shall have to pay the price in men and money. Part of the money burden is borne in taxes; part must be carried by bonds. The former is unescapable; the latter is voluntary.

The road to Berlin is a hard one, but it may not prove to be so long as it has seemed at times during the past four years. Our soldiers have started over it and they will

carry on to the end. Meanwhile we at home must do our all, not our "bit," to smooth and shorten the road.

Let us buy Liberty Bonds to the limit of our several abilities. Let us buy until we can buy no more. Every dollar of over-subscription of the fourth loan will be a nail in the Kaiser's coffin.

We have spent over \$3,700,000,000 for arms and ammunition. We have got to keep on spending. Buy Liberty Bonds and help.

Concrete and Steel Bridges

(Continued from page 118)

less of a side wall to the floods and is often substituted for it even beyond its economic length. So it frequently becomes necessary to give up entirely the idea of a concrete span for a steel design because of the lessened bulk and the corresponding reduced obstruction to the flow of water.

Steel Bridges.

This subject covers such a broad field and has been so thoroughly developed that in the remaining short time I can give you but the briefest outline.

Superstructures.—There is an almost indefinite number of styles and types of trusses.

In the early days, wooden arches with covered roadway were very common and these bridges, 75 years old, are still in use in some of the eastern states. The earliest type of a satisfactory wooden span was the Howe truss, which has a wooden top and lower chord with wooden diagonal members all held firmly together by vertical iron bars. Many of these bridges were built on the early railroads and highways and are still being constructed in those sections where timber is plentiful and steel expensive.

One of the earliest forms of the all-steel bridge is the suspension span, consisting of a series of cables anchored on each end, running up over towers situated on the banks. From these cables, hangers are suspended for the support of the floor system. The Brooklyn Bridge over the East River is a notable example of this style.

Coming down to the present time and confining ourselves to the highway bridge, we have but two types of spans in common use—the Pratt truss and the Warren truss. The Pratt truss is perhaps the simplest, the most economical and the most satisfactory for highway purposes of any that has ever been developed. It has straight horizontal top and lower chord, the former in compression and the latter in tension, with intermediate posts in compression and hangers and long diagonal members in tension. These bridges can have either a low truss or a high truss, the latter having an overhead system of braces above the roadway. In length the low trusses are usually from 24 to 100 ft., and the high trusses from 80 to 400 ft.

This type of span can have so many variations, such as the half-hip for short spans, thus the inclined top chord, the double intersection and the subdivided panel for the long span. There can be either deck or through trusses and both pin-connected and riveted bridges. In fact, having such simple lines, so easy of computation and analysis and so economical in its design, it stands out today as the one type of bridge most satisfactory to the engineer.

The Warren truss is used quite commonly in rivet-connected spans of shorter lengths, but principally in low trusses, rarely in bridges over 80 ft. in length. A few high trusses have been constructed of the Warren type, but on account of the long diagonal members being in compression, it makes an unsatisfactory design, and is contrary to the best engineering practice.

Difficult locations involving complicated erection prob-

lems often require special designs. For instance, in places where it is impossible to safely erect falsework it is quite common to select an arch or cantilever truss which can be erected by balancing each increment of steel until it closes in the center and becomes a continuous and a complete structure.

Foundations.—The best foundations for steel bridges are concrete with the seats for the shoes reinforced. The piers or abutments should rest on solid strata, the same as for the concrete bridge, or piling should be driven to a firm and substantial footing. Quite frequently steel tubes 3 to 6 ft. in diameter are settled into place, never less than 6 ft. below any possible wash, with piles driven through the bottom deep into the river bed. Concrete is then poured about the head of the piles and the tube completely filled. Each shoe of the truss sets on one tube, thus making a very satisfactory support.

Floor Systems.—For hard surfaced roads and well traveled highways, nothing but substantial and permanent floors should be constructed. Either concrete floor slabs, spanning from beam to beam, should be used, or else steel joist with a concrete covering. This concrete should be strongly reinforced and made in the most careful manner of not less than a 1:2:4 mixture. These floors should be so joined to the abutments as to provide a perfectly smooth connection with the roadway at each end of the bridge. As in concrete spans the wings and approaches are of great importance, for they serve to maintain a safe and satisfactory roadway up to and over the structure.

I will not draw the paper out to any greater length, but will close by giving you a few rules that should be observed in bridge building and maintenance:

1.—Be sure and build your foundations high enough so that the floor system of the bridge will be above any known high water.

2.—Always carry your foundations at least 6 ft. below any future wash in the bed of the river.

3.—See that the design of your wings and backing at the end of the bridge is such as to maintain a permanent approach fill.

4.—The steel of your spans should be thoroughly scraped with steel brushes, and painted at least once in every three years.

5.—Cracks due to settlement or expansion in concrete structures should be carefully repaired once every year.

6.—In deciding upon the kind and length of a new bridge for a given location be sure to carefully compute from the area of the watershed the flood waters that must pass under the structure.

7.—Never build a bridge with less than 16 ft. of roadway, and it would be much better to make it 16 or 20 so as to have sufficient width for the passing of vehicles.

More than \$120,000,000 has been spent for staple supplies such as flour, bacon, rice and the like for our soldiers. Buy bonds and help feed the boys over there.

Pennsylvania Projects Disapproved

United States Highways Council Holds Proposed Road Improvements Non-Essential at This Time

Several highway projects in various Pennsylvania counties have been disapproved by the United States Highways Council as non-essential at this time, according to a recent statement by State Highway Commissioner J. Denny O'Neil.

The first list of projects disapproved, as given out by Commissioner O'Neil, included the following:

Route 62, Cambria Township, Cambria County; route 276, Croyle Township, Cambria County; state aid application 720, Lawrence Township, Clearfield County; state aid application 583, Shickshinny Borough, Luzerne County, and a bridge on

state highway route 201 in Lower Merion Township, Montgomery County.

The State Highway Department proposes to put these roads into passable condition so that they can be used during the winter and will take up this work as soon as possible.

In addition to the projects noted above, the council also disapproved the building of Martins Creek-Bangor Road in Northampton County, and Commissioner O'Neil has rejected the bid for this work received on Aug. 1.

Later reports from Commissioner O'Neil state that additional projects in six counties have been disapproved. The locations of these proposed improvements are as follows:

Hollidaysburg Borough, Blair County; Philipsburg Borough, Centre County; Elkland Borough, Tioga County; St. Marys Borough, Elk County; North Annville Township, Lebanon County; Farmington Township, Warren County.

At the opening of bids on Sept. 5, no bids were received for the work proposed in North Annville Township and Farmington Township. The authorities of St. Mary's Borough were unwilling to proceed with the road improvement planned at the price bid in the proposals received on Aug. 30.

Oversubscribe the Fourth Liberty Loan

Highway Work in Mississippi

Progress Being Made Although War Conditions Have Impeded the Efforts of Officials in Charge

Work under the direction of the Mississippi State Highway Department has progressed in a manner that is satisfactory in view of the adverse conditions under which it has had to be carried on, according to a recent statement.

Higher prices for materials, difficulty in obtaining them at any price, transportation troubles, the labor shortage and the attitude of some of the railroads in the state are cited as the obstacles that have been encountered. All but the last mentioned, of course, have hindered work in nearly all parts of the country. The position taken by certain railroad companies, according to State Highway Engineer Duncan Buie, has delayed the improvement of 135 mi. of road. By securing injunctions, the railroads opposed the issuance of bonds in Sabine, Natchitoches, Rapides, Avoyelles, St. Landry and Red River Parishes.

The soldier gives; you must lend; buy bonds

Fuel Consumption By Cement Manufacturers Curtailed

Fuel Administrator Issues Order Materially Reducing Amount of Fuel To Be Used

The United States Fuel Administrator has issued the following regulations, restricting the fuel consumption by manufacturers of cement:

"1. That the term 'cement' in this regulation shall be construed to cover all Portland cement, natural cement, and Puzzuelan (slag) cement made by any process whatsoever, as those terms are customarily used in the trade.

"2. That the term 'manufacturer' in this regulation shall be construed to cover any person, firm, association, or corporation engaged in the manufacture of cement.

"3. No manufacturer, as defined above, shall at any of his plants consume, burn, or use fuel of any description, including coal, coke, natural gas, fuel oil, or other petroleum products, or use power derived from any such fuel, for

or in connection with the manufacture of cement, as above defined, during the year beginning January 1, 1918, and ending December 31, 1918, to an amount in excess of the amount required to manufacture 75% of the average annual production of cement at such plant during the period from January 1, 1915, to December 31, 1917."

Exceptions to this rule may be made in certain cases, including those in which the cement is required for Government purposes; those in which the cement is required for building operations of urgent public necessity, and those in which two or more manufacturers combine their operations. Manufacturers are also permitted to use wood or peat for fuel to produce more than 75% of their normal output, when the wood and peat so used do not have to be transported by rail.

We have nearly 2,000,000 men in France. Every subscription to the Liberty Loan will help to make it 4,000,000

Road Work Indefinitely Held Up in Rock County, Wisconsin

Bids Received for Concrete Paving Rejected as Too High; Work Indefinitely Postponed

Bids received recently for the construction of a concrete pavement on the road between Beloit and Janesville, Rock County, Wisconsin, were rejected by the State Highway Commission as too high. The pavement was to be laid on a 4-mi. section of a trunk line to be improved by federal aid. According to County Highway Commissioner C. E. Moore, it "appears certain that work on the road will not be commenced until after the war."

The county board had voted a bond issue to provide funds for use with state and federal aid to build the road. Plans and specifications were prepared, submitted to Washington, and, after a delay of several weeks, were approved. Bids were then invited—with the result noted above.

bonds to help the Government take care of its fighting men. It has cost us over \$500,000,000 to clothe our soldiers. Buy

Deferred Classification for Workers in Highway Transportation

Provost Marshal General Provides for Putting Necessary Workers in Highway Transportation in Deferred Class in New Draft

The War Department has authorized the following statement from the office of the Provost Marshal General, in reference to men engaged in highway transportation:

"Concerns engaged in the transportation within cities and along the public highways elsewhere of necessary commodities may claim deferred classification for their necessary employees under the provisions of the recent act of Congress referring to 'persons engaged in industries, occupations, or employments, including agriculture, found to be necessary to the maintenance of the military establishment, or the effective operation of the military forces, or the maintenance of national interest during the emergency.'

"In such cases, as in all others where claim for deferred classification is made on this ground, evidence must be submitted to the district board to show (1) that the particular concern making the claim is 'necessary to the maintenance of the military establishment, or the effective operation of the military forces, or the maintenance of national interest during the emergency;' and (2) that the individual for whom the claim is made is a necessary employee of that concern."

Pennsylvania State Highway Department Employees to Sell Bonds

Entire Force of 8,000 to Participate in Fourth Liberty Loan Drive

The eight thousand employees of the Pennsylvania State Highway Department are to take an active part in the campaign to sell Liberty Bonds of the fourth loan. State Highway Commissioner J. Denny O'Neil has requested all of the employees of his department to buy bonds and to use their influence to sell bonds to others. The request was made in a letter to the head of each division, assistant engineers and county highway superintendents. The text of the letter follows:

"Some one has said: 'They also fight who help a fighter fight.' We cannot all go to France, but we can do our duty here at home. We all have a splendid opportunity to show our patriotism. The fourth Liberty Loan to raise five or six billion dollars will start on September 28, and I want to make a special request of each and every one of the eight thousand employees of the Highway Department not only to buy bonds themselves, but to exercise all of their influence and ability, in conjunction with the local committees, in selling Liberty Bonds.

"I suggest that you take this matter up with the employees in your division and impress upon them, each and every one, the importance of making the loan a great success.

"I would also suggest that you get in touch with the chairman of your local committee and work in harmony with him. He will furnish you with literature and instruct you how to sell the bonds. Of course it is understood that all subscriptions made in any of our departments will be turned in to the local committee in whose district the subscription is taken."

Money means munitions; buy bonds

Former Governor Dunne Advocates Illinois Bond Issue

Appeals to Workingmen of Cities to Vote Yes on the \$60,000,000 Bond Proposition at the November Election

An appeal to the workingmen of Chicago and other large cities of the state to vote for the \$60,000,000 state road bond issue at the November election, was made by former Governor Dunne at the Tractor Exhibit held recently in Chicago. Governor Dunne spoke in part as follows:

"Good roads benefit all the people. They affect the people in the country districts most directly, and I take it for granted that almost the unanimous vote of the rural communities will favor the bond issue.

"The workingman in the city, however, may feel that he doesn't get out on the country roads very often and that he needn't take time to vote on the little ballot. That is a mistaken idea. In the production of the materials that go into good roads, by far the greater proportion of the cost goes to labor in wages. This affects the workers in the production of brick, cement, stone, tar, asphalt, sand, gravel, coal, machinery, tools and numerous other lines. Railroad men who transport these materials also will feel part of the benefit.

"After we win the great war the labor market will have to be readjusted. The far-seeing workingman, as well as the statesman, is looking forward to that day.

"We should prepare for it now. During my administration as governor, I spoke for the good roads bond issue on every possible occasion. We were not in the war then. Now that we are in the war, I believe that there is an

added incentive for the support of the proposition. I hope every voter will support it and I particularly appeal to workingmen in the big cities of the state to take an extra second or two in the ballot booth and vote for the good roads bond issue.

"Under the plan of building the roads, all the cost will be paid by automobile owners and not a dollar by the man who does not own an automobile."

If you can't fight, your money can; buy bonds

Oregon Road Building

Work on Necessary Projects to be Continued

Work on necessary road projects in Oregon is to be continued, according to a recent report from that state. This report is based upon two telegrams, one sent by Julius Meier, Regional Chairman of the Highways Transport Committee of the Council of National Defense, to Secretary R. C. Hargreaves of the committee, and the other, the reply of Secretary Hargreaves to Chairman Meier. Mr. Meier's telegram follows:

"Many connecting roads contracted prior to April 5, 1918, are very near completion in Oregon. J. E. Pennybacker, of United States Highways Council, Willard Building, in your city, issued Bulletin No. 1, of United States Highways Council, apparently prohibiting the use of certain road materials in completing unfinished contracts. See bulletin mentioned. I believe the Government determined that there was no shortage of fuel oil on this coast. There is no shortage of road material in this state.

"Great damage will be caused on account of the long rainy season unless the roads are completed prior to that time. Note bulletin mentioned. No road material can be obtained after Sept. 10 without permission of the United States Highways Council, which might cause the closing down of work in Oregon on projects mentioned, entailing great loss financially and otherwise. The State Highway Commission has not sufficient time to secure permission to purchase road materials required under the bulletin.

"All the projects under way are under bond issues approved by the Federal Capital Issues Committee. The completion of these roads is absolutely necessary for the establishment of truck routes, inasmuch as these roads must be hard-surfaced to be used during the winter. If it is not presumptuous on my part, will you see Pennybacker and have the United States Highways Council telegraph our State Highway Commission to proceed with unfinished work in Oregon?"

The reply received by Mr. Meier from Secretary Hargreaves was as follows:

"The United States Highways Council today telegraphed Oregon Highway Department that when material and supplies could be secured by them there was no reason why they could not proceed with construction work; that only in cases where the work is not going and and they could not secure materials or supplies it would be necessary to make application to the United States Highways Council."

Freemen buy bonds; slaves wear them—buy bonds

Street Paving in Washington, D. C., is to go forward under a suspension of the eight-hour law, approved by President Wilson on Sept. 16. This has been done in order to expedite the work under an \$85,000 appropriation made last month for construction and repair work on streets and avenues leading to buildings utilized by the Government in war work.

MOTOR VEHICLE TRANSPORTATION

Motor Truck Drive-Aways

Figures on Number of Trucks Sent to Seaboard Under Own Power

According to a recent announcement by Lieut. Col. W. D. Uhler, speaking for the War Department, about 5,000 pieces of motor equipment have been delivered at Atlantic Coast ports from cities in the Middle West by means of drive-aways. Over 20,000 more trucks are to be delivered in the same manner according to Col. Uhler. In his statement he called attention to the necessity for taking this factor into account in the preparation of road building programs.

Motor Truck Association

New Name Adopted by the Motor Truck Club of America

At a meeting held on Aug. 27, the Motor Truck Club of America voted to change its name to the Motor Truck Association of America, the change taking effect on Sept. 19.

The action was taken, it is stated, because there has been considerable misunderstanding as to the objects of the organization and its methods of obtaining them, because of the incorporation of the word "club" in the title. It is expected that the change in the name will help to eliminate the misunderstanding of the organization and its purpose and will be of considerable aid in the prosecution of the aims of the organization, which is made up of men engaged in motor truck transportation.

Increased Use of Highways Urged

Council of National Defense Issues Statement Covering Labor Problems in Connection With Highway Transportation

The Council of National Defense, through the Highways Transport Committee, has authorized the following statement relative to the adjustment of labor problems arising in connection with highway transportation:

Recognizing that the vital need for increasing transportation facilities of the country during the war may be realized only through the most effective utilization possible of the highways, the United States Employment Service has instructed its representatives to refer all labor problems arising in this connection to the Highway Transport Committee, Council of National Defense, to which committee all highways transport problems are being delegated.

The task thus delegated involves the adjustment of labor employed in any phase of transport activity, either power or horse-drawn. In referring these duties to the Highway Transport Committee, J. B. Densmore, Director General, United States Employment Service, has transmitted the following letter to R. C. Hargreaves, Secretary of the Highways Transport Committee:

Dear Sir:

The U. S. Employment Service recognizes the wartime need for making the most effective and efficient utilization of our highways as a means of strengthening and increasing our transportation resources and especially is acquainted with the valuable direction given by the highways transport committees to this problem.

We are also convinced that tonnage capacity of our highways transport resources can be greatly increased by applying all possible vehicles, horses and labor in line with national policies

promulgated by you and, naturally, in transportation that vitally aids in accomplishing our war program.

We, therefore, desire to effect any adjustment of labor employed in any phase of highways transport activity relating to either power or horse-drawn vehicles in cooperation with your national organization, relying on your state highways transport committees to furnish the facts regarding essential highways transport activity with which they are intimately familiar and on which our state and local labor department officers may base their necessary orders.

We are, therefore, transmitting instructions to our representatives, advising them that all matters touching or in any way affecting highways transport operations are to be dealt with on the advice of your organization.

Secretary Hargreaves states in connection with the above that the policy of the Highways Transport Committee will be to conserve and strengthen every element of highways transportation and to so direct it as to serve those industries which vitually aid in accomplishing the war program, as indicated from time to time by the War Industries Board.

Motor Trucks in California

Regular Service Over Public Highways Established by 115 Operators

Further evidence of the part which the motor truck is playing in solving the transportation problem of the country is furnished by the records of the California Railroad Commission.

These records show that since the passage of the law regulating motor vehicles operated on daily schedules, 280 applications for franchises have been received. Of the total number of applications made, 115 have been granted, and the applicants are now operating motor vehicle transportation lines over California highways. In many cases these routes serve cities not reached by railroads.

To Develop Motor Truck Routes

Bureau of Markets of the Department of Agriculture Offers to Cooperate With Operators

The Bureau of Markets of the United States Department of Agriculture has announced its readiness to enter into cooperative agreements with operators of motor truck routes who desire to work with the Government in developing such enterprises, and who will agree to work in conformity with the general requirements of the bureau.

Truck operators who desire to take advantage of this offer must agree to maintain dependable service and schedules; to charge just rates based on the cost of operation, plus a reasonable profit; to keep satisfactory records of operating cost and furnish them to the bureau; to use uniform bills of lading approved by the bureau, and to provide adequate insurance of shipments. In return the bureau will give to operators the advantage of information obtained through its investigations and will furnish metal signs for display on the trucks of operators meeting the requirements. These signs will read: "The owner of this truck is cooperating with the Bureau of Markets, United States Department of Agriculture." The privilege of using the foregoing sentence on stationery and in advertising will also be granted.

Application blanks to be used in obtaining the signs may be obtained from the Chief of the Bureau of Markets, United States Department of Agriculture, Washington, D. C.

MEETINGS

Calendar of Coming Meetings

Oct. 2-3.—Vermont Society of Engineers.—Fall meeting, Montpelier, Vt. Secretary, George A. Reed, Montpelier, Vt.

Oct. 2-4. American Society of Municipal Improvements.—Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington Ill.

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Vermont Society of Engineers

The fall meeting of the Vermont Society of Engineers will be held at Montpelier, Vt., on Wednesday and Thursday, Sept. 2 and 3.

At 8 p. m. on Wednesday Prof. G. H. Perkins, State Geologist, will address the society on "The Geology of Central Vermont and Smugglers' Notch."

On Thursday an automobile trip will be made, during which some of the state highways will be inspected. A visit will also be made to the mill and mine of the Magnesite Talc Co., near Waterbury.

Highways Transport Committee of the Council of National Defense

A meeting of the regional chairmen of the Highways Transport Committee of the Council of National Defense was held at Washington, D. C., on September 17, 18 and 19.

The following statement relative to the meeting has been authorized by the Council of National Defense:

"Recognition of the highway's value as a transportation resource was evidenced by the appearance before the committee and its chairman of cabinet officers, members of the National Railroad Administration, the Food Administration, the War Industries Board, the National Highways Council, the Electric Railways War Board, the Army and the United States Senate. President Wilson received the conferees at the White House at the conclusion of the sessions.

"Every one of the governmental agencies whose war work can be effected by the full utilization of highways transport proposed a close cooperation between his own organization and the nation-wide organization which the Highway Transport Committee, under the direction of Roy D. Chapin, Chairman, has achieved in the last nine months. All were glad to suggest means of developing this coordination for America's common cause.

"Herbert Hoover, Federal Food Administrator, warmly approved the development of the rural express as a means of saving perishable foodstuffs now produced, for stimulating production of more food, for lowering costs of living, and for conserving farming man-power for the soil. Mr. Hoover observed that 50% of the perishable products in

America are wasted, largely through ineffective means of getting it to the market. Fast, intimate service by rural expresses, he foresees, will be a great source of saving. By the use of motored expresses, Mr. Hoover pointed out, the farmer need not maintain so many draft animals on the farm, animals that eat the crops of millions of fertile acres that otherwise could be devoted to raising food for people. The failure of the public market in America, Mr. Hoover said, was caused by inadequate transportation of an intimate sort, and he believes that a developed rural express will give public markets a basis of economic success and tend toward lower price levels.

"Franklin K. Lane, Secretary of the Interior, tied the highways development into his plan for putting millions of returned soldiers and their families on small farms carved by the Government from great areas of public domain now either unused or in need of reclamation.

"I can see the making of a new America,' said Secretary Lane, 'a nation of farming communities and small industrial centers; for each will have its own creamery, cannery and other means of taking care of its surplus products. These farming communities will be populated largely by returned veterans, comrades in arms, comrades in peace, the material, political, and spiritual leaders of these communities. These centers must be developed and tied together and made easy of access by good roads, over which the most efficient of transport will move goods to market.'

"William C. Redfield, Secretary of Commerce, told the regional chairmen that he regarded highway, waterway and railway as a trinity of economic usefulness, incapable of fullest function unless all factors of it were developed efficiently. He pointed out that the perfection of the internal combustion engine has given both highways and waterways a new tool—the motored vehicle on the roads, the motored barge on the rivers and canals. He remarked that though the Hudson River were bordered with three times the rail lines it has now, and its waters ploughed by all the ships it could carry, still the farmer living inland 5 mi. from it would fail to profit unless given access to docks and depots by rural expresses. Secretary Redfield said he regarded legislation to restrict the size of motor trucks in order to save the roads as a menace to development of highways transport as intolerable as it would have been to have stopped locomotive development 40 years ago because engines and cars were getting too heavy for the light rails of those days. Our transportation routes must be fitted to the new tools, he declared.

"Relief for the railways by another of the Highways Transport Committee's projects—the store-door delivery system—was welcomed by Edward Chambers, former vice president of the Santa Fe Railroad, now Director of Traffic in the National Railroad Administration. He urged the chairmen to promote the trucking of less-than-carload shipments from the manufacturing centers to communities 30 and 40 mi. out, and the cooperation of the highways regional chairmen with the railway regional traffic directors to facilitate the clearing of the terminals in the larger cities. Mr. Chambers announced that in conjunction with the Highways Transport Committee, the Railroad Administration is trying out the store-door delivery system in New York, with hopeful results. If it meets expectations there, it will be extended to other large centers.

"Mark L. Requa, Director of the Oil Division of the Fuel Administration, asked the committee's cooperation in a campaign to promote more efficient operation of all gasoline-

powered vehicles and the conservation of fuel through the stopping of wasteful practices and non-essential running.

"The army was represented before the conference by Lt.-Col. W. D. Uhler, Q. M. C., in charge of army truck convoy service. Lt.-Col. Uhler bespoke the cooperation of the chairmen in providing for the clearing of roads during the coming winter, when, as it has for nine months now, the Army will be moving long trains of motor trucks from inland factories down to the seaboard under their own power and cargoes with munitions.

"Joseph D. Baker of the War Industries Board's staff, asked chairmen to help make clear to motorists and garage managers the necessity of saving both materials and manpower, and suggested ways in which such savings can be effected.

"Reports made by the regional chairmen show tonnage moved over the highways increasing at a tremendous rate, in some states as much as 400% increase over last year being shown. The Cleveland-Akron area reported 61% as much freight being moved by motor express now as the railroads are carrying. High development of the return loads bureau, which insures most economical operation of highways transport, was noted in the state of Connecticut, with Hartford acting as the central bureau. In Cincinnati and Omaha, live stock is being carried to stockyards over the highways in increasing numbers. Rural express has reached its highest efficiency in Maryland, New Jersey, eastern Pennsylvania and southern New York. Arrangements have been made to connect New York State Barge canal ports with the farming communities back from it by rural express.

The Highways Transport Committee is completing a country-wide organization that will number more than 15,000 committeemen, manufacturers, farmers and consumers, all working through contact with the state councils of defense and with the committee's regional chairmen. These chairmen, all but one of whom were at the entire conference, are J. Randolph Coolidge, Jr., Boston; George H. Pride, New York; C. A. Musselman, Philadelphia; W. Tom Winn, Atlanta; Harry L. Gordon, Cincinnati; John J. Stockton, Chicago; J. F. Witt, Dallas; Julius H. Meier, Portland, Ore.; L. A. Nares, Fresno; and Earle Brown, Minneapolis. Mr. Brown, who could not attend, was represented by Messrs. Babcock, Chairman of the Minnesota Highway Transport Committee, and Mr. Leach, of Minneapolis."

American Society of Municipal Improvements

The 24th annual convention of the American Society of Municipal Improvements will be held at the Iroquois Hotel, Buffalo, N. Y., on Wednesday, Thursday and Friday, October 2, 3 and 4.

Wednesday morning and evening will be devoted to committee and sub-committee meetings. The sub-committees on standard specifications will meet with those interested as follows: Asphalt Paving, F. P. Smith, Chairman, 11.00 a.m.; Bituminous Paving, A. W. Dow, Acting Chairman, 11.30 a.m.; Broken Stone and Gravel Roads, A. H. Blanchard, Chairman, 12.00 m.; Brick Paving, E. H. Christ, Chairman, 12.30 p.m.; Concrete Paving, A. W. Dean, Chairman, 2.00 p.m.; Stone Block Paving, H. H. Schmidt, Chairman, 2.30 p.m.; Wood Block Paving, E. R. Dutton, Chairman, 3.00 p.m. The Special Committee on Standard Tests for Bituminous Materials, of which A. H. Blanchard is chairman, will meet at 4 p.m., and the General Committee on Standard Specifications, of which George W. Tillson is chairman, will meet at 4.30 p.m. The meeting of the Executive Committee of the organization will be held at 2 p.m.

The evening session on Wednesday will be occupied by the addresses of welcome and the responses, the President's address by Norman S. Sprague, Chief Engineer of the Bureau of Engineering, Department of Public Works, Pittsburgh, Pa., committee reports and the reports of officers. Among the reports to be received are those of the Special Committee on Standard Tests for Bituminous Materials, and the Special Committee for the Revision of the Constitution, of which George W. Tillson is chairman.

The morning session on Thursday, Oct. 3, will be devoted to sewerage and sanitation.

The afternoon session on Thursday will be occupied by papers and reports on paving and sidewalks. The report of the Committee on Street Paving, W. A. Howell, Chairman, and the report of the Committee on Sidewalks and Street Design, S. Sammelman, Chairman, will be received at this session. The following papers will also be presented: "Who Shall Pay for Paving," by Ellis R. Dutton, Assistant City Engineer, Minneapolis, Minn.; "Pavement Base in Buffalo," by George F. Fisk, Assistant Engineer, Buffalo, N. Y.; "Maintenance of Old Asphalt Pavements," by C. E. P. Babcock, First Assistant Engineer, and J. A. Vandewater, Assistant Engineer, Buffalo, N. Y.; "Standardizing of Required Consistency of Asphalt," by J. R. Draney, General Sales Manager, U. S. Asphalt Refinings Co.; "Longitudinal Cracks in Brick Pavements," by William C. Perkins, Chief Engineer, Dunn Wire-Cut Lug Brick Co.; "Napped Trap Block Pavements," by Thomas E. Collins, City Engineer, Elizabeth, N. J.

At the evening session on Thursday, committee reports and one paper on highway subjects will be presented. The reports are those of the Committee on Standard Specifications, George W. Tillson, chairman, and the report of the Committee on Street Lighting, W. Thomas Wooley, chairman. A paper entitled "Regulation of Street Occupation Under Franchises," will be presented by Lee W. Eighmy, Assistant Engineer, Buffalo, N. Y.

At the morning session on Friday, Oct. 4, reports will be received from the Committee on Parks and Parkways, C. E. Putnam, chairman; the Committee on City Planning, Nelson P. Lewis, chairman, and the Committee on Traffic and Transportation, Louis L. Tribus, chairman.

On Friday afternoon there will be an automobile trip around the city and through the surrounding country, including visits to the City Water Works and to industrial plants.

The evening session on Friday will be taken up by the presentation of papers and the reception of committee reports. The Committee on Street Cleaning and Refuse Disposal, George H. Norton, chairman, will present its report, and a paper on "Motor Tractors in Street Cleaning," will be presented by William F. Schwartz, Street Commissioner, Buffalo, New York.

It has recently been announced that the Exhibits Committee has decided to have exhibits at the meeting.

Buy bonds before it's verboten

Inspectors in the Bureau of Highways, Philadelphia, Pa., have been granted an increase in pay. The 40 employees affected by the ruling will receive \$1,300 a year, an increase of \$100.

Sherman and Wasco Counties, Oregon, have agreed to appropriate \$25,000 each towards the construction of a concrete arch bridge across the Deschutes River on the Columbia River Highway. The estimated cost of the bridge is \$75,000, and it is expected that the state will pay the difference between the total and the amount appropriated by the counties. The bridge will be about 600 ft. long.

EQUIPMENT—TRADE—MATERIALS

New Booklet on Tarvia

A booklet describing the use of Tarvia in private estates has just been issued by the Barrett Company, of New York, N. Y.

The booklet is 9x6 in. in size and consists of 32 pages, including covers. A few pages are devoted to a description of Tarvia and its uses and the remainder of the book is taken up with full-page reproductions of photographs of Tarvia-treated roads, principally in private estates. There are also included some illustrations of other roads built or treated with that material.

The booklet is well printed in two colors, on white paper of excellent quality.

"Hydrated Lime in Concrete Roads"

An 8-page booklet of the above title has recently been issued by the Lime Association of Washington, D. C., successor to the Hydrated Lime Bureau of the National Lime Manufacturers' Association.

The booklet, which is 6x9 in., describes tests of concrete containing hydrated lime, which were conducted by G. W. Hutchinson, Testing Engineer of the Delaware State Highway Department. The contents include extracts from a report made by Mr. Hutchinson to Charles M. Upham, Chief Engineer of the Delaware State Highway Department, a table showing the results of tests and several paragraphs discussing these results. The booklet is illustrated by a chart showing the effect of hydrated lime on the compressive strength of concrete specimens, and two half-tone

reproductions of photographs of the DuPont Boulevard, a cement concrete road in which hydrated lime was used.

Orenstein - Arthur Koppel Company Sold

The Orenstein-Arthur Koppel Co., a corporation manufacturing contractors' equipment and similar goods, was sold at public auction by A. Mitchell Palmer, Alien Property Custodian, on Sept. 12 to N. A. Chamberlain, Auditor of the Pressed Steel Car Co., for \$1,312,000.

The company was a branch of the German firm known as the Arthur Koppel Aktiengesellschaft, with main offices in Berlin. The American branch was established about ten years ago and was conducted by Arthur Riche, Karl Hansen and Eric Joseph, all German subjects, who are now interned in this country.

The sale of the corporation includes the plant at Koppel, Pa., and various subsidiary companies. The Koppel plant comprises an erecting shop, a machine shop, a forge shop, a car shop, a wood-working shop, a track shop, a power plant, a works office building and a central office building. The company also owns a hotel, a number of houses and a large tract of land. The subsidiaries sold with the company are the Koppel Land Co., the Beaver Connecting Railroad Co., the Koppel Water Co. and the Koppel Sales Co., of Koppel, Pa.; the Pennsylvania Car & Manufacturing Co., of Pittsburgh, Pa., and the Universal Railway Products Co., of New York, N. Y. The company maintained branch offices at New York, N. Y.; Chicago, Ill.; Pittsburgh, Pa., and San Francisco, Cal.

PERSONAL MENTION

B. O. Bendixon has resigned as county engineer of Jefferson County, Washington.

Frank M. Preston has been appointed city engineer of Victoria, B. C., to succeed C. H. Rust' resigned.

W. H. Amos has resigned as deputy county engineer of Whitman County, Washington, to enter the Corps of Engineers, U. S. Army.

Leon C. Gray has resigned as engineer in charge of field work for the Public Service Department of the City of Grand Rapids, Mich., and has become associated with the Portland Cement Association, with headquarters at Detroit, Mich.

W. Tom Winn, of Atlanta, Ga., has been appointed regional chairman of the Highways Transport Committee of the Council of National Defense for the fourth district, which comprises North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee and Mississippi. Mr. Winn, who is in the insurance business, has served a term as county commissioner of Fulton County, Georgia, and has been prominently identified with the good roads movement in the South for a number of years. He is a director of the American Automobile Association, president of the Georgia State Automobile Association and honorary president of the County Commissioners' Association of Georgia.

Robert S. Beard, Acting City Engineer of St. Louis, Mo., has been ordered to report at Washington, D. C., for duty in the Construction Division of the Army.

Payne G. West has been appointed assistant manager of field sales for the Lakewood Engineering Co. of Cleveland, Ohio. Mr. West has been with the T. L. Smith Co. of Milwaukee, Wis., for about twelve years.

A. C. McKibbin, who has served as secretary of the Missouri State Highway Board since it was organized in March of last year, retired from that position on Sept. 20. He will retain his position as a member of the State Highway Board, however, having been appointed by Governor Gardner for a four-year term. Each member of the board is allowed a salary of \$1,000 a year and expenses, and Mr. McKibbin, the only member of the board to devote his entire time to the board, was allowed an additional salary of \$2,000 a year. In February the Attorney Generals' office ruled that although there was no constitutional or statutory provision to the contrary, it was "against public policy" for a member to draw a salary as secretary; hence Mr. McKibbin's withdrawal. He has announced that he will devote practically all of his time to the development of the Highways Transport Committee of the Missouri Council of Defense and to the work of the Capital Highways Association, which has opened offices in Jefferson City.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, OCTOBER 5, 1918

Number
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Phantom Canon Highway

New Scenic Road Between Cripple Creek and Canon City, Colorado,
Formally Opened to Traffic

The Phantom Canon Highway, a scenic road connecting Cripple Creek and Canon City, Colorado, has recently been formally dedicated and opened to traffic. Besides providing an automobile route of unusual attractions, the road is noteworthy as an example of the utilization of an abandoned railroad grade for highway purposes.

In the early days of Cripple Creek a narrow gauge railway was built to carry ores from the mines to the smelters and to carry foodstuffs and other commodities from the valleys to the mining camps in the hills. The line was known as the Florence & Cripple Creek Railroad and was used for a number of years. In the course of time, how-

ever, the road's business became too small to warrant further operation and the project was abandoned.

The right of way was cut through solid rock for miles, and the original cost was probably about \$1,000,000.

When a demand arose for a highway connecting the districts formerly served by the railroad, the boards of county commissioners of Teller and Fremont Counties, with the cooperation of the State Highway Commission, secured the right of way and started to convert it into a highway. The new road is 37 mi. in length, with a maximum grade of 4½%. It is surfaced with disintegrated granite, a material that stands up well under traffic and drains



BRIDGE AND TUNNEL ON THE PHANTOM CANON HIGHWAY BETWEEN CRIPPLE CREEK AND CANON CITY, COLORADO.



OLD RAILROAD BRIDGE MADE INTO HIGHWAY
BRIDGE—PHANTOM CANON HIGHWAY.

well. The old railway roadbed has been widened where necessary and the existing bridges and culverts have been repaired or rebuilt throughout the road's length. While the road is a succession of curves it is wide enough to permit cars to pass at most points. The cost was about \$75,000.

A formal opening ceremony was held at Glenbrook, midway between Cripple Creek and Canon City, on August 30. The affair was under the auspices of the State Highway Commission and the county commissioners of Fremont and Teller Counties, and was attended by several hundred motorists from El Paso, Fremont, Teller and other Colorado counties.

Motor Apparatus in Use in the Department of Public Works, Bureau of Streets, Buffalo, New York*

By WILLIAM F. SCHWARTZ†

The City of Buffalo at the present time has two Elgin motor sweepers. These sweepers were bought and placed in operation on Oct. 1, 1916, replacing 6 horse-drawn sweepers and two sprinkling wagons. They work two shifts 8 hours each per day, namely 3 a.m. to 11 a.m. and 4 p.m. to 12 p.m. They are a combination sprinkler, sweeper and pick-up, being equipped with a 200-gal. tank, large circular broom, and 1½-cu. yd. box. The motive power is a 45 hp. engine.

During the fiscal year ending June 30, 1918, they cleaned approximately 72,000 great squares. (A great square consists of 10,000 sq. ft.) We find they did the best work on smooth pavement, and that the cost per great square was about 2 ct. lower than in horse-swept districts. On account of the abnormal times we have had considerable trouble in getting competent drivers, consequently the machines have not been worked as satisfactorily as under normal conditions.

During the past year three motor street flushing equipments were installed by the department to replace the old method of flushing and in some districts street cleaning.

In constructing and designing this equipment the department took into consideration, 1st, cost of equipment; 2nd, length of time of service; 3rd, operation and maintenance; 4th, size.

From the above we specified a 5-ton tractor with power take-off from transmission to pump that delivers pressure for flusher; a trailer with 2,000-gal. tank capacity set upon

the fifth wheel on tractor. Tractors in operation are the 5-ton Pierce-Arrow of standard design, with exception of power take-off of 15 hp. and are geared 42 to 1. The tractors are equipped with dual 36-in. tires rear, and single front.

The trailers and pumps are manufactured by Chas. Hvass & Co., of New York City, and are provided with cylindrical tank, four nozzles which are controlled from driver's seat, centrifugal pump driven from power take-off; also controlled from driver's seat. The pump creates a pressure of 35 lb. (This pressure can be increased or decreased.) We find that 35 lb. will not injure the pavement and at the same time does cleanly work. When the street is very dirty we use the four nozzles, which gush 525 gal. per minute, but as a rule use only two nozzles which flow 150 gal. per minute. During the process of flushing, tractor runs at a speed of 4½ mi. per hour, running empty 14 mi.; weight of tractor and flusher when full 18 tons, when empty 10 tons.

During the winter season the trailers are removed from tractors, and the tractors are placed in operation in snow work, also hauling trailers for ash and garbage districts. We estimate during the past winter that these three tractors saved the city at least \$15,000 in snow work alone. A great many of our streets in the outlying districts became drifted, and it was an utter impossibility for the city to get labor to take care of same, notwithstanding the fact that we placed every available prisoner which we could commandeer from the penitentiary. We equipped the tractors with "Good Roads" snow plows and found they did excellent work.

The cost of operation per day (which includes operating charges, maintenance and fixed charges) for a 16-hour day we found to be \$24.96. During the winter months this cost increased \$2.00 per day on account of more gasoline and oil being used by being forced to run low gear the greater part of the time on account of bucking heavy drifts of snow.

Under the old system of flushing with portable line hose the cost per great square of 10,000 sq. ft. was \$1.40. We experimented with the two-man reel (used in New York City) and found the cost to be 56 ct. The motor equipment reduced the cost to 20.5 ct. per great square. This includes everything, such as operating labor, supervision and pick-up wagons.

The city has contracted for three additional flushers, and it is the intention of the department as soon as financial conditions warrant eventually to do away with all horse-drawn sweepers and sprinklers and flush the entire town with the exception of cobblestone and macadam pavements, as we find the cost per great square for sweeping is \$0.278 and that of flushing is \$0.205. It is not only more economical but leaves the streets in a more cleanly condition besides being more sanitary.

For two months we demonstrated with trailers and tractors in the Ash and Garbage Division and found we could cut the expense approximately 25%, also getting greater efficiency. The system followed in the demonstration was to start empty trailers drawn by horses from various barns to the different districts. When these trailers were loaded we had tractors with train of four empty trailers drop off same, taking up loaded trailers and proceed to dump or reduction plant, continuing this operation until districts were cleaned up.

At the present time we have six Ford motor trucks in operation in the Ash and Garbage Division. These trucks have a capacity of four yards, but have been in operation for only four months, consequently we cannot get a definite line upon the maintenance and depreciation. The class of drivers we are able to get are inexperienced (being mainly boys of 17 to 19 years of age) so that these trucks are often laid up for repairs. In the writer's opinion this form of

* Paper presented at the 24th Annual Convention of the American Society of Municipal Improvements, Buffalo, N. Y., Oct. 2-4, 1918.

† Street Commissioner, Buffalo, N. Y.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

E. L. POWERS
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Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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14

PUBLIC OPINION ON HIGHWAY TRANSPORTATION

The tonnage of commodities moved over the highways is increasing at a "tremendous rate," according to the Highways Transport Committee. In a statement by that body printed in last week's issue, it was set forth that reports made by regional chairmen at the meeting in Washington showed that in some states the increase over last year's haulage was as much as 400 per cent.

This furnishes as striking and convincing proof of the importance of this recent development in the transportation field as has yet been made public. It means that the motor truck and the improved road are furnishing a solution of one of the country's greatest problems—the moving of goods from place to place. It means, too, that both the motor-driven commercial vehicle and the improved road are essential in war time.

Ever since the United States entered the war "Good Roads" has urged the continued building of necessary highways and the intensive maintenance and repair of those already built. No opportunity to emphasize the importance of highway transportation has been neglected, no effort spared to awaken public opinion to the danger in any tendency to neglect road work during the present emergency. When the war started only a few realized the significance of the public road; now its availability as a means of transportation is very generally recognized. Even in those quarters where there has been evident a wish to restrict road work to an extent really dangerous to the country's continued success, there is appearing a glimmering of sense.

But the fight for the road has not been won. There still remains strong opposition to continued road work both by those in authority and by those with influence over public opinion. The Government still blows, now hot, now cold. One department urges the development of highway transportation and another immediately raises new obstacles to the construction and maintenance of roads and streets. One bureau does all it can to aid, another its utmost to hinder. Among the newspapers of the country a dozen urge the building and upkeep of essential roads, but one or two clamor for the cessation of all "new construction."

It is not only desirable, but necessary, to so mould public opinion that the resulting demand for continued road work will have to be met. Road builders and the users of motor trucks can render very valuable service in that work. They know the need of roads and have abundant opportunities to impress the salient points in the present situation upon others. Much can be done through personal efforts; the local press will welcome interviews and letters.

If the users and builders of roads will get together and insist upon the proper recognition of highway transportation as a vital factor in winning the war, that recognition will have to come, and thereby will victory be brought appreciably nearer.

WHEN TO STOP IN BUYING LIBERTY BONDS

Of course all you road users and road builders have bought Liberty Bonds of the fourth issue. And of course you are going to buy some more.

Some of you may think you have reached your limit, but when you are asked to make further purchases you are going to think for a minute—but only a minute—and then you are going to dig down deep in your pocket and take another fifty, hundred or five hundred dollar bond.

You are going to think how well off you really are. You are going to remember that while perhaps you are exerting yourself to keep up with the high cost of living, you are still fairly comfortable. You have enough to eat, you have a roof over your head, and you have sufficient clothes to keep you warm and presentable. In fact, you probably have much more—probably a few amusements, more clothes than you really need and a lot of little luxuries that you could forego without real discomfort or inconvenience.

Then you are going to think of the boys over there. You are going to remember that they have given up all the things that you look upon as necessities. They are sleeping in the open, some of them; eating what they can get, when and where they can get it; at intervals going out into No Man's Land to kill or be killed. And all the time they are in the shadow of death, or worse.

Then it is going to occur to you that every dollar invested in Liberty Bonds makes those boys a little more comfortable and brings a little nearer the day when they can come marching home to the things that they long for and that you are taking as a matter of course.

And then you are going to buy and buy and not stop until your conscience tells you that you may.

TRANSPORTATION IN WAR

No more forcible presentation of the importance of transportation in war has been made than the one in an authorized statement from the War Department relative to the Motor Transport Corps, which is printed elsewhere in this issue. After describing the personnel of this newly created branch of the Service, the statement continues:

"By the time, therefore, that the United States has 4,000,000 troops in France nearly half a million of them will be engaged in motor transport work."

In other words, one of every eight men, or 12½% of the men in the American Expeditionary Forces, will be used in transportation in what, in the case of a railroad, would be called operation and the maintenance of rolling stock. But while this proportion may seem large, it does not include by any means all of those whose work is transportation, for it does not include all of the engineers and others who are employed to build, maintain and repair the roads—those who, to again turn to the railroad for illustration, are used in the maintenance of way department. Figures on the number so employed are not at hand, but it is known to be very large. Add to the numbers in the Motor Transport Corps and in road work the prisoners of war who are used in the latter, and it is possible to gain some real appre-

ciation of the part played by transportation in modern warfare. If the missing figures were available it is not unlikely that they would show that transportation work required one man out of every four or five used in the active fighting and all the incidental activities of war.

Motor Apparatus in Use in the Department of Public Works, Bureau of Streets, Buffalo, New York

(Continued from page 128)

truck is too light in weight for collecting ashes, for the reason that the dumps through which they have to go have a tendency to badly jar the entire machinery on account of their light construction.

It is the intention of the department after we have won the war to motorize the entire Ash and Garbage Division. This would have been done at the present time but we find it is an utter impossibility to obtain competent drivers; also, the cost of equipment is 40% to 50% higher than it would be during normal times."

Who Shall Pay for Paving?*

By ELLIS R. DUTTON†

Who shall put the "pay" in paving? Those who receive the benefits. The question and answer are stated in the shortest, most logical and equitable manner. There is no question but that the improvement of a street or road is a benefit, else such improvements would not be made. Streets and roads are made for the accommodation of the general public and abutting lands to facilitate communication among peoples.

This is the basic idea—that the use of the roads and streets should be free and that the public as a whole should pay for the improvement of such thoroughfares. This may look good on the face of it, but let us see how it works out.

The road or street that is given for the free use of the public is in the condition as originally left by nature, and maybe it can be used, but generally it cannot be used to any advantage by the public; therefore the abutting lands cannot be utilized because of insufficient approach. In such a case the land is of little value, but improve the street or road and the land immediately takes on an added value by reason of such improvement, and such enhanced value is attributed directly to the improvement. In other words, the improvement is a decided benefit to such land. This enhancing in value of abutting property can be and is seen in every city, and in every case where streets or roads are paved the increased value of the property is more than the cost of the improvement. Shouldn't these benefited lands pay for the paving?

There are also other lands not abutting on the street or road, but lying a little removed; say, in a city, a block or so away. This property is also benefited to some extent and should also contribute something toward the improvement. Perhaps in the case of this original improvement the general public might be considered benefited to some extent so that the payment for the original pavement would be made by these three classes, the larger of which is naturally the abutting land, and in much less proportion the contiguous land, and the general public. In a great many places the whole cost is paid by the abutting property, and in others the general public pays for the street intersections, etc., paying its part of the total frontages. In no city has it been successful to compel the general public to pay a very large part of the expense, as the public will not stand for it, and, therefore, no work will be done.

For the purpose of financing the work and making the annual payments against the abutting property reasonable, the governing body should provide the funds as a loan and make the time of payment extend over a term of years, say from 5 to 20.

After this original payment is made, the abutting property should not be called on to pay for another pavement, as the road when it is completed is turned over to the operating department, so to speak, as in railroad management.

While we are speaking of railroads, did you ever notice the similarity between roads and railroads? The construction is done by bonds and stocks in railroads, and by bonds and abutting property holders in the roads. After construction it is turned over to the operating department, which is the management in railroads, and expenses for maintenance, betterments and operation are paid by the traffic rates. In the case of roads such maintenance, repairs and renewals should be paid by the users of the road, in the shape of license or wheel tax, proportioned to use. Another striking similarity is also shown in the increased loads, trains and engines in the case of railroads, necessitating almost complete reconstruction of the roadbeds, bridges, etc., to permit of such increases. So, in the case of the improved roads, the increased loads and the development of the auto truck have necessitated the reconstruction of many roads and the building of better and more substantial road surfaces. In the case of the railroads, the users pay for these improvements, and why not so on our roads? It surely would be unfair to the abutting property owner to oblige him to pay for the repairs of his road, which were made necessary by reason of the use of the road by persons that did not contribute to its original cost. Make the persons benefited pay for the cost of what they use. Is it fair for me to pay for a pavement to be used by you for your personal benefit?

Another feature of the present day use of roads is the general tendency to increasing the loads enormously without any regard or reference to the ability of the pavement to hold up under these loads. There are millions of yards of improved streets and roads in the country costing millions and millions of dollars which are being destroyed by ruthless overloading, and all of this has been paid for, not by the users or abusers, but by the property owners, who receive almost no benefit from this abuse. Who shall pay for this destruction and reconstruction? Surely the users.

But before total destruction, regulations should be made by the authorities as to allowed loading, so as to prevent the road's destruction and, if heavier road surfaces are necessary, to provide funds and methods for such heavier roads. The Government and public are beginning to awaken to this fact, and are asking why they should provide smooth and economical roadways without cost to private parties to use for their personal benefit. Some of the license laws of our state are a farce when they license a light passenger car or a heavy 6-ton truck for three years for five dollars. Make the tax or license commensurate with the use and destruction of the road surface.

There is another item of destruction of road surfaces, and that is climatic action. Perhaps the general public might be entitled to pay for such deterioration, but it would be small compared to that from use.

Investigation and statistics should be made and collected to provide some basis for these license fees, and it should be done quickly or there will be no pavement left to use. Make the persons benefited pay for the paving.

The State of Missouri has available for road work \$1,369,384 obtained from motor vehicle licenses. It is stated that very little of this money will be spent in the near future because of difficulty of obtaining either labor or material.

* Paper presented at the 24th Annual Convention of the American Society of Municipal Improvements, Buffalo, N. Y., Oct. 2-4, 1918.

† Assistant City Engineer, Minneapolis, Minn.

Standardization of Required Consistency for Asphalt*

By J. R. DRANEY†

About three or four years ago the writer contributed a communication, which was published in "Engineering News," regarding the many varieties of penetration required in the production of asphalt for paving purposes. At that time it was set forth that the demand upon asphalt refiners for so many different penetrations of asphalt was an undue hardship and one which, from a practical viewpoint, was totally unnecessary. For example, under similar conditions, one city will prefer a penetration of from 60 to 65, while another city will require a penetration of from 55 to 60 or 65 to 70, and there are some cases where a penetration of from 70 to 75 has been required for sheet asphalt. Penetrations of from 35 to 40, 40 to 45, and 45 to 50 are also required.

There is also a variation in penetration requirements for asphalt to be used in asphaltic concrete, but these variations do not cover as wide a range as the asphalt required for sheet asphalt work. Penetration requirements for asphaltic concrete range from 60 to 65, 65 to 70, 70 to 75 and 75 to 80, and in some cases between 80 and 90, but the latter is demanded only where asphaltic concrete carrying a goodly proportion of large-sized stone is used.

Asphalt to be used in asphaltic macadam by the penetration or pouring process, is likewise called for by the trade in penetrations ranging from 90 to 190. We have many instances where penetration of from 80 to 100 is demanded. Probably the penetration that is more largely required averages from 110 to 120. The specifications of the New York State Highway Department require from 140 to 190.

These wide ranges in penetrations for asphalt to be used in the same type of work are due principally to a lack of concordant ideas and are the result of individual tastes. It has caused a lot of extra work, expense, time, trouble and worry to asphalt refiners and during the present season has become more obnoxious than ever, due to the shortage of asphalt.

The company with which the writer is connected has manufactured asphalt in the last few years with penetrations covering a total aggregate of twenty different ranges for sheet asphalt, asphaltic concrete and asphaltic macadam. Quite often the refinery may have on hand a stock of asphalt with several ranges of penetration, but will be out of the penetration required for that "hurry up" order which must be shipped immediately. The contractor is awaiting the material, but we dare not ship anything but the penetration within the range that he has ordered, as the authorities under whom he is working would not permit it to be used.

The war has impressed upon all of us the pronounced need for greater efficiency and economy. Therefore, why the necessity of producing so many different varieties in a material when there is no real excuse or reason for it except that of individual ideas?

Coordination of ideas, with a resultant standardization should be realized. We trust that the American Society for Municipal Improvements will inaugurate such a movement affecting the use of asphalt for paving and that other societies will follow suit.

There are but three varieties of penetration necessary for sheet asphalt, one for streets with heavy traffic, one for moderate traffic and one for light traffic. The same may be said of asphalt required for asphaltic concrete pavements. For asphaltic macadam there should be one range

of penetration and that a fairly wide one. For example, a specification giving a penetration requirement of from 100 to 125 would cover the matter properly and effectively.

The matter should be given serious thought, and we hope for concordant action which will result in a practice that will make for increased efficiency and economy, and at the same time secure a much needed standardization in the consistency of asphaltic material for paving purposes.

Highway Bridge Work Under War Conditions

United States Highways Council Issues Bulletin for Guidance of Officials

The United States Highways Council has issued bulletin No. 3, dated Sept. 26, 1918, covering the matter of highway bridge work during war time. The text of the bulletin follows:

"In view of the absolute necessity of providing for military and naval purposes such large quantities of steel and iron that the use of these materials even for the indirect war needs of the Federal Government has been necessarily curtailed, often against the strong protests of Government engineers, it is the opinion of the United States Highways Council that the street and highway bridge policy of all sections of the country should be based until further notice upon the following principles:

"(1) Every endeavor should be made to keep existing structures in service by all available means, such as (a) effective supervision, (b) suitable repairs, (c) control of traffic, (d) prohibition of use of bridges by street car, road rollers, traction engines, and other heavy vehicles.

"(2) The possible relief of a weak bridge by a detour utilizing a safe structure should be investigated. The improvement of such a detour by using materials which can be obtained without serious delay may be preferable as a war time measure to the reconstruction of a steel bridge.

"(3) In some sections of the country the urgent Government requirements for cement are now very heavy. Public officials should not forget that materials like cement and brick, which require fuel for their production, cannot now be turned out in the same quantities which were made in peace times, for the fuel is needed in war industries and for absolutely necessary civil purposes. Consequently, public officials are not justified in assuming that if they change their plans for proposed structures from steel to concrete, it will be possible for them to build new bridges without any difficulty.

"(4) If public officials find that it is impossible to maintain existing structures and cannot substitute temporary bridges for those that are unsafe, they should apply to the United States Highways Council through their state highway departments for approval of their projects. An application should be made out for each bridge on forms obtainable from the state highway department. With each application there should be a statement of the size and date of construction of the bridge, the conditions of the piers and abutments, any stream conditions such as floods or caving banks which affect the maintenance or reconstruction of the bridge, the local materials available for bridge work, and evidence of the impossibility of maintaining the present structure or substituting a temporary structure of materials obtainable without Government assistance. Public officials are reminded that the United States Highways Council looks to them for assistance in reducing to the absolute minimum the bridge materials required.

"(5) The Council contemplates three classes of bridge projects which appear worthy of favorable consideration during the war period:

"1. A bridge urgently required as a military necessity and

* Paper presented at the 24th Annual Convention of the American Society of Municipal Improvements, Buffalo, N. Y., Oct. 2-4, 1918.

† General Sales Manager, U. S. Asphalt Refining Co.

so recommended by the representative of the War Department to the United States Highways Council.

"2. The replacement of an unsafe bridge which can not be made safe through suitable repairs, traffic regulations, or detour.

"3. Replacement of a bridge which has been destroyed and which is essential as a direct or indirect war need."

Burning Leaves on Pavements

A Practice Followed in Many Localities Wastes Valuable Fertilizer, Besides Injuring the Pavement

By JOHN S. CRANDELL*

Commercial fertilizers are scarce and expensive this year, and agriculturists are urged to utilize to the utmost natural enrichers of the soil. But in spite of the serious situation confronting them, people will continue the practice of former years and will burn all their leaves instead of using them for bedding, or enriching the soil. This is one source of waste; for the burned leaves are valueless, but the leaves left to rot are nature's way of aiding in restoring fertility.

The place usually selected in suburban localities and towns for burning leaves and rubbish raked off the lawns is the road or pavement in front of the premises. Many towns have ordinances against this, but they are rarely enforced. If the taxpaying residents only realized what havoc is wrought with the pavements, there would be drastic measures adopted to put an end to the practice.

Take a walk through any town that boasts of having lawns and gardens worth admiring, and note the condition of the pavements after the fall leaf-burning festival is over. All the bituminous pavements, especially where they are carried to the curb, will be found to be pitted and scarred from the heat of the burning leaves. The brick pavements will not suffer as much, but they will be marked and in some cases cracked on the surface. Wood block will suffer badly, and even stone block will be affected, especially if a soft filler has been used. There is also the possibility of damage to curbs and gutters. This is the second source of waste.

Heretofore we have let things slide, but this year, and for many subsequent years we must conserve our assets—and good pavements are among our best assets. It is going to be increasingly difficult to obtain materials of construction next year, and it is going to cost a great deal to make repairs and to maintain the pavements we have at present in a satisfactory condition. Every pile of leaves burned means deterioration of the pavement on which they are burned. Every hole or soft spot made in a bituminous pavement, either asphalt or tar, means that the pavement will fail just so much sooner unless it is repaired in a short time. Every pile of leaves burned on a bituminous pavement is going to cost the town at least \$5.00. If this is brought to the attention of the people there will be less waste and better pavements.

It will pay the city authorities to put up posters advising against burning leaves on the pavements, or anywhere else, and advocating utilizing them for fertilizer purposes or for bedding. And the time to act is now.

Use of Blast-Furnace Slag for Road Construction

In a recent issue of "Commercial Reports" Consul General Robert P. Skinner, of London, England, writes as follows:

"Blast-furnace slag for a number of years past has been used in the country districts and manufacturing towns of England for the construction of roads and as a macadamizing agent. If properly selected, it forms a very good foundation, but should be placed at an incline in such a manner

as to hold each lump upon its adjacent lumps, to prevent rocking, and then should be covered over with fine blast slag and properly rolled and consolidated afterwards.

"It is also successfully used with tar and other bituminous materials for footway and sidewalk paving."

New Bridge in Philadelphia, Pennsylvania, Benefits Through Traffic

Holme Avenue Bridge Over Pennypack Creek Is on the New York-Philadelphia Route of War Traffic

A new bridge carrying Holme Avenue, Philadelphia, over Pennypack Creek, has recently been completed by the Department of Public Works of that city.

Holme Avenue is one of the three branches of Northeast Boulevard, an important thoroughfare leading from the central portion of the city northeasterly towards New York and the great industrial area between the two cities.

The bridge has a total length of about 350 ft. and is 80 ft. wide. It has three concrete arch spans, the center one 88 ft. long and the two end spans 55 ft. each. It carries a 54-ft. driveway and two 13-ft. sidewalks.

Work on the Dixie Highway in Tennessee

State Highway Department to Complete Various Projects by Force Account

Failing to obtain satisfactory bids the State Highway Department of Tennessee has decided to undertake the construction by force account of federal, state and county projects along the Dixie Highway between Nashville and Chattanooga. It is stated that bids received on two projects for the completion of 22 mi. were \$50,000 in excess of the engineer's estimate, although the latter was made on a basis of increased cost.

One of the first projects undertaken will be the construction of 2.5 mi. of road on Cumberland Mountain. This will make available about 4 mi. of road graded a year ago and will give an outlet into Chattanooga.

Highway Improvements Permissible Without Special Permit of War Industries Board

The following is authorized by B. M. Baruch, Chairman of the War Industries Board:

"The exceptions from the general regulations laid down by the priorities division of the War Industries Board that all non-war construction shall be done on special permit include:

"Structures, roads and other construction projects falling within the following classification: Undertakings, cleared and approved by the War Industries Board, directly by or under contract with the War Department or the Navy Department, Shipping Board, Emergency Fleet Corporation, the Bureau of Industrial Housing and Transportation of the Department of Labor or the United States Housing Corporation.

"Repairs of or extensions to existing buildings involving in the aggregate a cost not exceeding \$2,500, and new construction for farm purposes involving in the aggregate a cost not exceeding \$1,000.

"Roadways, buildings and other structures undertaken by or under contract with the Railroad Administration or a railroad operated by such administration,

"Those directly connected with mines producing coal, metals, and ferroalloy minerals.

"Public highway improvements and street pavements when expressly approved in writing by the United States Highway Council."

*Consulting Engineer, General Tarvia Department, The Barrett Co., 17 Battery Place, New York, N. Y.

MOTOR VEHICLE TRANSPORTATION

Importance of the Motor Corps

Authorized Statement by the War Department Describing Size and Organization of New Branch of the Service

The recent creation of the Motor Transport Corps to take over from all other corps control of all motor vehicles in the Army will entail the execution of plans of great size and scope.

The Motor Transport Corps' personnel and equipment with each American army will comprise nearly as many men and officers as were engaged on both sides in the battle of Waterloo—enough motor trucks to stretch in an unbroken line across the state of Ohio if they were parked end to end with 5-ft. spaces between them, and enough motorcycles and other vehicles to stagger by their mere numbers the masters of warfare in any other times than these.

The actual number of men and officers provided by the Motor Transport Corps to each American army, according to the personnel chart of the corps, is to be 154,747.

The army motor trucks with this unit will number 40,803; there will be 24,250 motorcycles, 7,905 passenger-carrying motor cars, and 6,598 ambulances, with a total of approximately 100,000 drivers and riders. The officers will number 4,298 and the non-commissioned officers 30,090.

The headquarters or executive organization for this service will consist of 3,122 men and 679 officers, and the total repair personnel in the 273 service parks provided for the upkeep of the army of motor vehicles consists of 34,319 men, a large percentage of them trained mechanics. Each additional American army will, of course, require a similar motor transport corps personnel. By the time, therefore, that the United States has 4,000,000 troops in France nearly half a million of them will be engaged in motor transport work.

These are a few indications of the scope of the Motor Transport Corps. The service has already accomplished a great work, according to military authorities, in facilitating the rapid movement of troops and supplies of the American Army in France, and army motor trucks throughout the United States are day by day helping in a no less important way.

Those interested in the service can secure information from the chief of the Motor Transport Corps at Washington.

Highways Transport Committee Aids War Program

General Goethals Commends Committee's Work in Speeding Up Delivery of War Supplies

The Highway Transport Committee of the Council of National Defense has recently authorized the following statement relative to the results of its efforts to foster highway transportation, particularly in connection with war work:

That the work of the War Industries Board, looking to the conservation of all materials entering into manufactures; the efforts of the Fuel Administration tending to the saving of space in railroad transportation that coal in needed quantities may be transported the coming fall and winter; the efforts of the Railroad Administration looking to the curtailment of unnecessary use of rail transport in every way possible are being supplemented in a most material way through the medium of the activities of the High-

ways Transport Committee, Council of National Defense, is the view being strongly expressed by those leaders in Washington in most direct touch with big war problems.

Among others, Maj-Gen. George W. Goethals, Assistant Chief of Staff, United States Army, sees in the work of the Highways Transport Committee a potential force capable of aiding in a vital way the work of the great war bodies of Washington. Recent utterances of the United States Fuel Administration and the War Industries Board drive home the need for conservation of rail transportation, especially in the states east of the Mississippi. So urgent is this need no interference with it will be brooked by those in authority.

Gen. Goethals, in a letter touching its activities, refers especially to the "great value" of the work of the Highways Transport Committee "in speeding up the delivery of munitions and other army supplies." In promoting the rural motor express idea, the return loads bureau, its plan of cooperation with the Federal Railroad Administration and the relief of terminal congestion, this body is daily producing concrete and satisfactory results along the line of those of its activities referred to by Gen. Goethals.

The letter of the latter, addressed to R. C. Hargreaves, Secretary, commenting upon the extension of the committee's work throughout the country, says in part:

It is with pleasure that I have noted the splendid work which is being done by the Highways Transport Committee in helping to increase the nation's transportation facilities by the development of the highways and the effective and efficient use of the motor truck.

So far as this department is concerned, the work of your committee is of great value in that it tends to result in speeding up the delivery of munitions and other army supplies which might otherwise be delayed through terminal congestion during this war time.

Motor Truck Hauling in Black Hawk County, Iowa

Motor Trucks Do County Work at a Cost of 19.6 ct. per Ton Mile as Compared With 30 to 40 ct. for Team Hauling

Black Hawk County, Iowa, according to a report by District Engineer W. H. Root, quoted in a recent issue of the "Service Bulletin" of the Iowa State Highway Commission, hauled road and bridge material by motor truck during 1917 at a cost of 19.6 ct. per ton-mile, as compared with a cost of 30 to 40 ct. per ton-mile for team hauling. Mr. Root's report is based on figures supplied by County Engineer N. B. Barber and is as follows:

"Many counties have bought and many more contemplate buying motor trucks for county hauling. Cost data on truck operation of this sort are extremely hard to find, and in most cases worthless when found. I believe the following data from Black Hawk County are accurate and should be of value to the other Iowa counties.

"At a cost of \$3,800, Black Hawk County bought a Duplex 4-wheel drive, 3½-ton truck from the Duplex Truck Co. of Lansing, Mich. Delivery was made in June and operation commenced June 25, 1917. This truck weighs, when empty, 8,815 lb., and while it is rated at 3½ tons it has carried a load of 5½ tons. Normally, by slightly heaping the box, the truck carries 3 yd. of gravel. The engine has 4x4½ cylinders and is rated at 48 hp. However, the license is paid on 28.9 hp. The truck has been used in the following

classes of work and all loading has been by hand. The total mileage traveled this season was 6,783 mi., made up as follows:

Hauling gravel for culverts.....	2,533
Hauling cement for culverts.....	1,549
Hauling steel for culverts.....	656
Hauling form lumber, etc.....	987
Hauling gravel for repair of roads.....	404
Miscellaneous, moving crew, etc.....	654
	6,783

"In doing this work, the following items of expense were incurred:

1,843 gal. gas.....	\$436.00
84 gal. lub. oil.....	50.00
62 lb. hard oil.....	7.00
Labor on repairs and adjustments.....	148.00
Tools and equipment.....	83.00
Repair parts	27.00
Labor for 2 men on truck.....	1,061.00
	\$1,812.00

"This makes an actual cost, per mile traveled of 26.7 ct. Or, if we consider that the truck was loaded half the time, the cost per load mile was 53.4 ct. As the average load was about 4 tons, this would make an actual ton-mile cost of 13.3 ct., not including any interest or depreciation. If we consider the life of the truck five years, the depreciation this year would be \$760. The interest on \$3,420 at 5% for six months would be \$86. This would make our gross season's cost \$2,658 or 39.2 ct. per mile, and 78.4 ct. per load mile. If we assume the same average load as before, 4 tons, the gross per ton-mile is 19.6 ct.

"These deductions that I have made from Mr. Barber's figures are subject to debate, but it is quite evident to me that an appreciable saving has been made on the old team hauling which consistently was from 30 to 40 ct. per ton-mile.

"Another saving which does not show up in these figures is the saving in time in moving from one job to another. The whole crew and equipment were moved by this truck at the rate of 4 mi. an hour. This enabled them to finish one job and in most cases be on the next job in a couple of hours."

National Standard Truck Cost System

Forms Used for Recording Data on the Performance of Motor-Driven Freight Carriers

The extensive use of motor trucks for freight hauling since the war has naturally directed attention to the cost of operation, with the result that the keeping of comprehensive records has become the rule with the more progressive firms and individuals using this method of transportation. Various methods have been employed for this purpose by different users, but one that has been found particularly well adapted to general use is that

Form 2 NATIONAL STANDARD TRUCK COST SYSTEM. TRUCK OWNERS CONFERENCE, INC.				
MONTHLY ANALYSIS OF OPERATION				CAP
* * INSERT FIRST MONTH OF FISCAL YEAR IN HEADING OF FIRST COLUMN, ETC.				
A.	NUMBER OF DAYS OPERATED			
B.	NUMBER OF ROUND TRIPS			
C.	DELIVERY OR PICK-UP STOPS			
D.	TOTAL UNITS _____ OUT			
E.	TOTAL UNITS _____ IN			
F.	MILES TRAVELED			
G.	GALLONS OF GASOLINE OR K.W.H. CURRENT			
H.	PINTS OF CYLINDER OIL			
I.	HOURS AVAILABLE BUT NOT USED			
J.	HOURS LOADING			
K.	HOURS RUNNING INCLUDING STOPS			
L.	HOURS LAID UP FOR REPAIRS ***			
M.	HOURS WITH HELPER			
N.	TRAILER DATA			
AVERAGES FROM ABOVE				
B 1	ROUND TRIPS PER DAY			
C 1	DELIVERY OR PICK-UP STOPS PER DAY			
D 1	TOTAL UNITS _____ PER DAY			
E 1	AVERAGE UNITS _____ PER TRIP.			
E 2	UNIT _____ MILES			
F 1	MILES TRAVELED PER DAY			
F 2	AVERAGE ROUND TRIP DISTANCE			
G 1	MILES PER GAL. OF GASOLINE OR PER K.W.H.			
H 1	MILES PER GALLON OF CYLINDER OIL			
J 1	AVERAGE HOURS LOADING PER DAY			
J 2	AVERAGE MINUTES LOADING PER TRIP			
K 1	AVERAGE HOURS RUNNING INCLUDING STOPS PER DAY			
P.	AVERAGE SPEED IN MILES PER HOUR			
Q.	ESTIMATED RUNNING TIME PER MILE			
R.	ESTIMATED TIME PER CUSTOMER'S STOP (IN MIN.)			
S.	COST PER DAY OPERATED			
T.	COST PER MILE			
U.	COST PER UNIT _____			
V.	COST PER UNIT MILE			

FORM 2—NATIONAL STANDARD TRUCK COST SYSTEM—MONTHLY ANALYSIS.

adopted by the Truck Owners' Conference, Inc., of Chicago, and designated as the "National Standard Truck Cost System." This has been used by the Packard Motor Car Co. in its hauling efficiency competition which ended on Sept. 1,

Form 1 NATIONAL STANDARD TRUCK COST SYSTEM. TRUCK OWNERS CONFERENCE, INC., CHICAGO. 8-1918																									
DAILY RECORD, MONTH OF _____										HOURS IN WORKING DAY		FROM _____ TO _____		TRUCK NO. _____											
OPERATING DATA										COST DATA				COST OF REPAIRS (POSTED TO FORM 3c)											
DATE	MILEAGE	TRIPS	DELIVERY OR PICK-UP STOPS	TOTAL UNITS (SEE D)		MILES	TIME IN HOURS AND MINUTES								GASOLINE OR CURRENT		CYLINDER OIL		DRIVER COST	HELPER COST	COST OF REPAIRS				SUBSTITUTE VEHICLE RENTAL
				OUT	IN		APPLICABLE BUT NOT USED	LOADING	PARKING INCLUDING STOPS	LAD UP FOR REPAIRS	GALLONS OR K.W.H.	COST	PINTS	COST	MATERIAL CHASSIS	LABOR CHASSIS	MATERIAL BODY	LABOR BODY			ACCIDENT AND CHASSIS				
1																									
2																									
3																									
4																									
5																									

FORM 1—NATIONAL STANDARD TRUCK COST SYSTEM—DAILY RECORDS FOR ONE MONTH.

FORMS 3A AND 3B—INVESTMENTS AND CHARGES.

Explain any unavoidable delay, using space on this side of sheet if necessary and referring to number of line. When goods are loaded or unloaded enter number of LOAD UNITS (pounds, cwt., tons, barrels, cases, etc.) in last column. If you make a delivery and also pick up freight at the same stop enter the amounts in each case, using two lines if necessary. If two lines are used enter time leave on second line and enter next stop on third line. When turning in truck each day enter time arrive, odometer and sign your name in lower right hand corner. Make sure that all spaces on this side of record have been filled in correctly and turn same in before leaving.

Forms Nos. 3A, 3B and 3C occupy one page. Form No. 3C has a line for each month of the year, a line for the totals and a line for the averages.

Form 4 NATIONAL STANDARD TRUCK COST SYSTEM. TRUCK OWNERS CONFERENCE, INC. CHICAGO, ILL. 1918

DAILY SERVICE RECORD, SUBJECT TO CHANGE TO SUIT INDIVIDUAL CONDITIONS.

Directions for Drivers Daily Service Record—Before taking out your truck each day read Odometer, including red figures on right, (tenths of a mile) and enter this reading on first line under heading ODOMETER. When you pull out enter the time under the heading TIME. LEAVE, HOURS (H) MINUTES (M). At each delay, delivery or pick-up stop enter Location: Time Arrive; Time Leave; Odometer; Cause for Stop, using the following letters to indicate the cause: L—Load; U—Unload; P—Pick-up; M—Meal; F—Ferry; T—Traffic Block; R—Road Repair; B—Break-down and Tow-in; O—Oiling; C—Collision; A—Accident, personal injuries. (OVER)

TRUCK	NUMBER	CAPACITY	MONTH	DAY	YEAR	
LOCATION	TIME		ODOMETER	MILEAGE	CAUSE FOR STOP	LOAD UNITS
	ARRIVE	LEAVE				
	H. M.	H. M.				
1						
2						
3						

The entire system is based on form No. 4, a separate sheet 5½ in. wide x 9½ in. long, designated as the "daily service record," which is kept by the driver of each truck. The

[illegible]

FORM 3C—MONTHLY COST ANALYSES FOR ONE-YEAR PERIOD.

MEETINGS

Calendar of Coming Meetings

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

PUBLICATION

"TYPICAL SPECIFICATIONS FOR NON-BITUMINOUS ROAD MATERIALS," by Prevost Hubbard, Chemical Engineer, and Frank H. Jackson, Jr., Assistant Testing Engineer, Office of Public Roads and Rural Engineering, U. S. Department of Agriculture. Bulletin No. 704, U. S. Department of Agriculture, dated Aug. 30, 1918. Paper 6x9 in., 40 pp. and covers; illustrated.

This is a similar publication to Bulletin No. 691 by Mr. Hubbard and Charles S. Reeve, Chemist of the Office of Public Roads and Rural Engineering, entitled, "Typical Specifications for Bituminous Road Materials." Like the other it consists of a set of specifications for roads of various types, and two appendices, one dealing with methods of testing, and the other with methods of selecting and shipping samples. The specifications included are for broken stone for water-bound macadam, for water-bound base, for bituminous macadam, for bituminous macadam wearing course and for one-size stone bituminous concrete wearing course; coarse broken stone for bituminous surface treatment; fine broken stone or gravel for bituminous surface treatment; broken stone, sand and filler for coarse aggregate bituminous concrete wearing course for fine aggregate bituminous concrete wearing course, and for binder course and sheet asphalt wearing course; broken stone and sand for one-course Portland cement concrete pavement; broken stone or gravel, and sand for Portland cement concrete base; gravel for water-bound gravel roads; gravel, sand and filler for coarse aggregate bituminous concrete wearing course; slag for water-bound base; natural sand-clay or top-soil mixtures for road surfacing; Portland cement; vitrified paving brick, cushion sand and grouting sand for brick pavement (two specifications); and granite block, gravel and sand for stone block pavement.

PERSONAL MENTION

John A. Giles, Commission of Public Works of Binghamton, N. Y., has been commissioned a captain in the U. S. Army.

F. L. Anders, City Engineer of Fargo, N. D., has been given a commission in the Quartermaster's Department of the Army.

C. E. Arnold has resigned as city engineer of Woodland, Cal., to enter the employ of the Los Alamitas Sugar Co., as engineer in charge of drainage and irrigation work.

A. F. Bates has been appointed town engineer of Montclair, N. J. Mr. Bates has been serving as acting town engineer since the resignation of Maj. Christopher Harrison.

T. E. Olsen, the resident engineer of the New Jersey State Highway Commission, has been given a first lieutenant's commission in the Engineer Officers' Reserve Corp, and has been assigned to duty at Camp Humphreys, Virginia.

W. G. Thompson, State Highway Engineer of New Jersey, has been granted leave of absence during the war by the State Highway Commission. Resolutions were adopted by the commission in appreciation of the services rendered by Mr. Thompson.

OBITUARIES

George M. Stevens, of the Central Construction Co., Boston, Mass., died on Friday, September 20.

Martin Schenck, formerly state engineer and surveyor of New York, died at Albany, N. Y., on Sept. 17. Much of Mr. Schenck's engineering career was in railroad work. He was state engineer and surveyor in 1892 and 1893.

Capt. E. H. Annear, of Company B, 43d Engineers, U. S. A., died recently at Hoboken, N. J., shortly after returning from France to act as a military instructor. Capt. Annear received his commission last January while serving his third term as county surveyor of Stanislaus County, California. He received two months' training at Camp American University, and went abroad with his company in April.

Side Road For Horse Traffic

At a recent conference of representatives of the New York State Association of Horsemen, at Syracuse, the desirability of building a side drive along the highways for horse vehicles was discussed.

The matter of preparing a bill for presentation at the next State Legislature will be placed in the hands of a committee of the association.

Parcels Post Service From Cincinnati to Lexington, Ky., and Other Points in Ohio

It is reported that there will soon be inaugurated a Parcels Post truck service between Cincinnati, Ohio, and Lexington, Kentucky, for the carrying of merchandise and other mail that has heretofore been handled exclusively by steam railroads. This will be Cincinnati's third long distance parcels post service.

The plans for the Cincinnati-Lexington service contemplate the departure of a south-bound truck from Cincinnati at 5:45 o'clock each morning. The route will be through Covington, Latonia, Independence and Falmouth.

It is expected that the new service will be a great boon for the residents along the route which the trucks will operate. It will also open up a new market not heretofore available to the farmers along the route.

Other parcels post routes are under consideration, one of them being the Cincinnati-Portsmouth service, Cincinnati-Dayton service and a route from Cincinnati through Lawrenceburg, Aurora, Rising Sun, Vevay to Madison, Ind.

Live-Stock Shipped by Truck Freight Congestion Leads to Utilization of Motor-Driven Vehicles by Stock Raisers

Farmers and stock raisers in the cattle country are turning to the motor truck for the solution of their hauling problems, according to C. T. Silver, Metropolitan Distributer of the Kissel Motor Car Company.

Proof of the practicability of this method of transportation he says, was furnished by a fleet of five trucks loaded with sheep and hogs, which recently passed through Dallas, Texas, on its way to the Fort Worth stock yards. The distance from Farmersville, where the trucks were loaded to their destination was 57 mi. and the trip was made in seven hours and at a lower cost than if the stock has been shipped by rail.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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Soft Stone Satisfactory Road Surfacing

Gravel Roads in Grand Isle County, Vermont, Demonstrate Possibility of Using Material Not Generally Approved

By THURMAN W. DIX *

For the past 75 years or more the gravel roads of Grand Isle County, Vermont, have had an enviable reputation. Because of the favorable comment which these roads receive, and because of the question, "Why are these roads so excellent?" a careful examination has been made in quest of an explanation.

The excellence so often spoken of manifests itself to the tourist through the pleasing riding qualities of the roads. It is safe to say that there are few roads—gravel, asphalt, concrete or brick—which the average automobilist prefers to these gravel roads.

receive that type of construction and maintenance to which they are suited.

The roads are constructed, in spring, summer or fall, by dumping gravel, in depths varying from 6 to 10 in., on the prepared subgrade, as shown in one of the accompanying illustrations. The gravel is smoothed and left loose to be compacted by traffic, as shown in another illustration, which shows the condition of the road three or four days after construction. Gravel No. 18 was used in both cases. The road shown in another illustration had been built about two or three months, of gravel No. 14, and was only partially



Surface Not Given Proper Maintenance.



Well Maintained Surface One Year Old.

GRAVEL ROADS OF SOFT STONE—GRAND ISLE COUNTY, VERMONT.

The examination revealed that the "why" of this excellence is and must be: first, the character of the materials used, and second, the treatment which these materials receive after being placed. The roads are good not because of any highly scientific or technical reasons, but because the gravels of which they are made are suited to certain kinds of construction and maintenance, and further because they

compacted when photographed. Maintenance begins immediately after construction, and may be divided into two parts. First, the split log drag is used on all roads, both old and new, immediately after each rain, and is operated constantly during the spring while the roads are soft. It is the drag which maintains the crown, fills the ruts and depressions, and provides the smooth riding surfaces; and without it, it would be almost impossible to maintain the roads. Second, any ruts and depressions not filled by the

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GRAVEL ROAD IN GRAND ISLE COUNTY, VERMONT—
DUMPING GRAVEL ON PREPARED ROADBED.

drag are filled by patrolmen with gravel similar to that used in the original construction. The illustration at the right on page 137 shows a road built and maintained about one year, as above outlined, and in the best of condition. The illustration at the left on the same page shows the condition into which the roads soon fall unless they are constantly cared for. These roads may be built and maintained for the most part with unskilled labor and with a small amount of equipment.

To ascertain whether or not the Grand Isle gravels possess any inherent qualities not possessed by other road gravels, specimens were taken from representative supplies, and tested. The results of the tests are given in the accompanying table.

The gravels may properly be divided into two classes, lake shore and bank. The lake shore gravels almost invariably consist chiefly of shale, while the bank gravels are made up chiefly of disintegrated limestone. Gravels No. 1 and No. 2 are lake shore gravels consisting of hard particles and of but little shale, and do not make as good roads as the other gravels. Some natural soil gains access to the roads through the action of the drag. To ascertain the character of this soil, specimens No. 17, No. 23 and No. 29 were taken and tested for cementing qualities. Their coefficients of cementation as shown in the table are very high.

A comparison of the tests with results of the materials in use shows that the sizing and gradation of the particles of the natural gravels have little importance. The gravels are of such nature that the coarser particles easily break up



GRAND ISLE COUNTY GRAVEL ROAD A FEW DAYS
AFTER OPENING TO TRAFFIC.

Specimen No.	Percentage passing						Abrasion			Coefficients of			Cementation		Specific gravity in lbs. per cu. ft.	Absorption in lbs. per cu. ft.
							Stand-ard specification	Ohio specification	Hard-ness	Tough-ness			Passed ½-in.	Passed ⅜-in.		
	2-in. ring	1½-in. ring	1¼-in. ring	1-in. ring	¾-in. ring	½-in. ring					½-in. to ¼-in.	¼-in. to ⅜-in.				
G-1	82.5	65.0	55.5	48.0	26.5	34.5	12.5	3.6	...	...	...	...	342	290	2.64	1.2
G-2	100.0	100.0	100.0	100.0	100.0	100.0	...	...	...	...	...	...	230	233	2.40	5.4
G-3	100.0	100.0	100.0	100.0	100.0	100.0	...	...	...	...	...	...	230	237	2.31	7.9
G-4	100.0	99.5	98.5	94.5	88.0	77.0	2.0	0.8	11.7	15.0	...	...	348	193	2.43	4.7
R-5	82.0	70.5	61.5	45.0	0.5	5.5	9.5	3.4	17.8	8.0	...	...	...	...	2.61	2.0
R-6	90.0	79.5	73.5	66.5	42.0	53.9	5.1	2.4	15.1	14.0	...	...	...	246	2.62	2.1
R-7	...	...	...	...	...	...	8.5	1.2	17.1	8.0	...	...	162	...	2.80	0.8
R-8	...	...	...	...	...	...	3.9	3.9	17.1	8.0	...	...	...	...	2.69	0.4
R-9	...	...	...	...	...	...	3.9	1.5	13.2	...	...	...	...	...	2.72	0.2
R-10	98.0	92.0	85.0	71.5	54.0	26.5	3.4	2.0	...	248	...	...	...	...	2.43	4.5
R-11	78.5	60.0	45.5	31.0	17.0	6.5	2.3	1.3	...	278	...	...	...	...	2.58	3.3
G-12	86.5	78.5	70.0	58.0	45.5	28.5	5.0	1.7	...	...	...	...	341	415	2.41	5.5
G-13	96.5	94.5	93.5	91.0	87.5	78.5	2.8	1.2	...	...	...	...	196	296	2.59	3.0
R-14	...	...	...	...	...	...	2.8	1.4	12.2	...	...	...	...	...	2.48	4.0
R-15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2.58	2.7
G-17	100.0	98.5	97.0	94.5	89.5	76.0	...	2.9	...	...	...	...	306	552	2.51	3.3
G-18	99.0	93.5	87.0	78.5	58.5	33.5	18.6	1.4	...	...	...	...	186	406	2.58	3.3
G-19	93.0	88.0	82.5	76.0	71.5	64.5	...	1.6	...	...	...	...	228	200	2.45	4.5
G-20	98.5	94.5	88.0	81.0	66.5	37.5	37.5	2.0	...	...	...	...	379	330	2.67	1.3
G-21	100.0	97.5	92.0	81.5	63.0	40.5	...	2.0	...	...	...	...	145	346	2.68	0.6
G-22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G-23	76.0	65.0	53.5	33.5	19.5	11.5	...	1.4	...	...	...	...	120	273	2.68	0.8
R-24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
R-25	86.0	82.0	78.5	74.0	67.5	58.5	8.3	1.4	16.2	10.0	...	...	310	333	2.68	0.6
G-26	91.0	81.0	72.5	58.0	48.0	30.0	...	2.8	...	...	...	...	239	83	2.68	0.5
G-27	99.0	96.5	92.5	77.0	67.5	52.0	...	1.0	...	...	...	...	467	228	2.70	0.9
G-28	...	...	...	...	...	...	...	...	...	...	...	...	...	437	...	...
G-29	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

*Shale; **lime; †earth from roadside; G, gravel; R, rock.

under traffic, and had the specimens been taken from the beaten path it is certain that the screening tests would have shown more uniform results.

Because of the difficulty in performing certain standard tests on the gravels, specimens of ledge rock were taken from several different places, this rock being fairly representative of the rock in the gravels of those respective vicinities.

The lake shore gravels are washed and usually free from clay, but when it is found it occurs in small amounts. The bank gravels contain more clay, the amount varying, but being as high as 18% in case of specimen No. 22.

The tests as commonly interpreted would indicate that the materials are generally inferior, or, at best, mediocre. Then how can we account for the favorable comment which these roads receive? It should be pointed out that they are seldom subjected to heavy traffic; that is, traffic consisting of heavy loads. When they are subjected to such conditions they break up and fail completely.

A careful study of the tests shows that there are two outstanding characteristics of this material; namely, its softness or low coefficients of abrasion and hardness, and its high cementing qualities.



GRAND ISLE COUNTY GRAVEL ROAD PARTLY COMPACTED, TWO OR THREE MONTHS AFTER PLACING GRAVEL AND OPENING TO TRAFFIC.

That a high cementing quality is a valuable asset for any road gravel to possess is an admitted fact, but that low coefficients of abrasion and hardness are assets becomes evident only after careful consideration.

It has been stated above that the coarser particles of these gravels easily break up under traffic, and this they do in the course of a few weeks. An examination will show that where a $\frac{1}{8}$ -in. layer of loose gravel has been placed and compacted by the action of traffic there results a well compacted crust some 2 or 3 in. in depth. This crust, for the most part, will consist of a well graded mixture of fine and coarser particles all firmly cemented together; all this regardless of the size of the particles as originally placed. Below this crust or wearing surface there will be found a layer of material, the particles of which have not been reduced in size, and which are not cemented together. The crust may be and is formed under automobile action; the particles are reduced in size, dust is formed, the elements provide the water, the automobiles provide the pressure, and a well cemented wearing surface results.

Now let us assume a material similar to the above in all respects except that it is hard and tough and shows high coefficients of abrasion and hardness. What would happen if we put this material on the roads in such sizes as are shown by the tests of some of the materials reported? An impossible condition would result, traffic would not grind the

particles, and a well graded mixture of fine and coarser particles all firmly cemented together could not possibly result.

Is it not fair to state that low coefficients of abrasion and hardness are an asset in this case? Are road builders generally insisting upon the use of material where a softer one would give better results? The very successful use of this soft stone may be an object lesson to those road builders in localities where hard rock is scarce but soft rock plentiful. It may be well said that lake shore gravel can not be had except in localities situated on large bodies of water. But why not crush soft stone? Lake shore gravel is nothing more than ledge rock crushed by nature through the well known process of weathering.

Under the traffic of from 200 to 500 vehicles daily to which these roads are subjected they wear out rapidly, and consequently must be resurfaced every few years. They are resurfaced in exactly the same way in which they are originally constructed, excepting that the depths of material may be different. In spite of the often necessary reconstruction of these roads they are without doubt the most economical type which Grand Isle County could adopt. There is no other type of road which could be built and maintained there for an equal amount of money and give such uniformly satisfactory results.

The success of the roads is due, firstly, to the employment of economical methods of construction, to the use of the King drag and to the patrol system, and, secondly, to the use of a material which is not too hard and possesses high cementing power.

Idle dollars are pro-German; buy bonds

Maryland Road Funds Released

Government Decision on Bond Issue Money Makes Available Nearly \$5,000,000

The Federal Government has given its consent to the use of the proceeds of the recent Maryland bond issue for the construction and maintenance of roads, according to advices from that state. This will release a large amount of money already appropriated and will make the total available funds nearly \$5,000,000.

The total amount is made up as follows: From the loan, \$1,500,000; from the federal aid road fund, \$640,000; from the budget for state aid roads, \$400,000; from the counties to meet the state aid, \$400,000; from the automobile licenses for the year 1917-18, \$758,000; from the automobile licenses for the current year, estimated, \$1,100,000; from the budget to make up any possible deficit in the maintenance fund, \$100,000.

Liberty Bonds or German bondage

The Chestnut Ridge Highway, near Lockport, N. Y., has been completed and opened to traffic. This road is one of the main thoroughfares between Buffalo and Rochester and has been under construction for about three years. The original contract for $5\frac{1}{2}$ mi. of road was abandoned by the contractors after the preliminary work had been done, and has been completed by the State Highway Department.

The Good Roads Association of York County, Pennsylvania, was organized at a meeting of men interested in good roads, held at the York Motor Club, York, Pa., on Sept. 14. A constitution and by-laws were adopted and officers were elected as follows: President H. N. Forrey, York; First Vice President, H. M. Stokes, Hanover; Second Vice President, Lewis Myers, Monaghan Township; Secretary, J. P. Trimmer, York; and Treasurer, William Swartz, Emigsville.

Reports at the Convention of the American Society of Municipal Improvements

Recommendations in Respect to Broken Stone and Gravel Roads, Wood Block Paving, and Tests for Bituminous Materials

In the issue of Oct. 5, three of the technical papers presented at the 24th annual convention of the American Society of Municipal Improvements were printed. In this issue are presented the reports of two of the subcommittees of the Committee on Standard Specifications, and also the report of the Special Committee on Standard Tests for Bituminous Materials. Other available papers and reports will appear in later issues.

Subcommittee on Broken Stone and Gravel Roads

A. H. Blanchard, Chairman

Your subcommittee on Specifications for Broken Stone and Gravel Roads respectfully submits its report covering its work during the preceding year.

We are herewith submitting in this report "Specifications for Surface Treatments with Cold Bituminous Materials" for use by municipalities.

It has been the object of the committee to present in its specifications fundamental principles of construction. In accordance with instructions received at the Wilmington convention in 1913, properties of materials have been incorporated in our specifications. It should be borne in mind that specifications covering properties of materials and certain details of construction must be varied in many cases in order that a given form of construction may be economical and suitable for local conditions. Therefore, the specifications incorporated in our report should serve as guides rather than standards adaptable to all conditions which may be found throughout America.

In recommending "Specifications for Surface Treatments with Cold Bituminous Materials" the committee wishes to call attention to the following facts which should be given special consideration in view of war-time conditions:

It is the duty of every highway engineer to assist in the conservation of materials and labor by eliminating all unnecessary surface treatments and taking precautions that unnecessary quantities are not employed in work which is done. In retreatment, particularly, double the necessary quantity of bituminous material is frequently applied, thus not only wasting material which may be urgently needed elsewhere, but producing a less satisfactory road surface than if the proper quantity had been used.

Under existing war conditions it is realized that it may be impossible to secure permits from the Fuel Administration for the delivery of material meeting the committee's specifications for "cut-back asphalt cements." To meet this temporary condition the following substitute specification for road oil is suggested as covering material which may be more readily obtained if excessive transportation is not involved.

Specifications for Road Oil

1. Its specific gravity at 25°/25° C. (77°/77° F.) shall not be less than 0.835, nor more than 0.970.
2. It shall have a flash point of not more than 50° C. (122° F.) when tested in an open cup oil tester.
3. When tested by means of the Engler viscosimeter at 25° C. (77° F.), the specific viscosity of the first 50 cu. cm. passing the orifice of the viscosimeter shall be not less than 80 nor more than 120.

4. When 20 gm. of the material is maintained at a uniform temperature of 163° C. (325° F.) for 5 hours in an open cylindrical tin dish 5½ cm. (about 2¼ in.) in diameter, with vertical sides measuring approximately 3½ cm. (about 1½ in.) in depth, the loss in weight shall be not more than 30%.

When the residue is tested by means of the New York Testing Laboratory float apparatus the float shall not sink in water maintained at 50° C. (122° F.) in less than 90 seconds.

5. Its bitumen, as determined by its solubility in chemically pure carbon disulphide at room temperature shall be not less than 99.5%.

6. It shall be soluble in 86° Baume paraffin naphtha to the extent of not less than 94% of its bitumen as determined by Clause 5.

As it is understood that products suitable for cold surface treatment are in general more readily available for fuel purposes than the heavier grades, hot surface treatments are suggested where necessary equipment is available. Surface treatments for dust laying should be abandoned during this period of restrictive measures, and the use of non-binding bituminous materials should be discontinued.

In order to reduce cost and avoid unnecessary transportation demands at this time it may be found advisable to cover bituminous surface treatments with material which will not strictly conform to the committee's recommended specifications for "Broken Stone Chips or Pea Gravel." Coarse local sand or a mixture of fine gravel and coarse sand which pass a ½-in. screen may be substituted as a war measure.

By observing the foregoing suggestions, cooperation with the United States Highways Council will be facilitated in connection with applications for highway work which are filed for its approval.

Specifications for Surface Treatments with Cold Bituminous Materials

Description of Bituminous Surface Treatment.—The bituminous surface treatment shall consist of one application of refined tar or cut-back asphalt cement covered with a thin layer of top dressing as hereinafter specified.

Note: This specification provides for a surface treatment which may be used on thoroughly cleaned broken stone or gravel roads in good condition; for the retreatment of tar surfaces or the maintenance of seal coats on tar macadam or tar concrete pavements if refined tar is used for the surface treatment, or for the retreatment of asphaltic surfaces or the maintenance of seal coats on asphaltic macadam or asphaltic concrete pavements if cut-back asphalt cement is used for the surface treatment.

Refined Tar and Cut-Back Asphalt Cement.—The refined tar or cut-back asphalt cement, hereinafter referred to as bituminous material, used in the construction of the surface treatments shall conform with its respective specification covering the chemical and physical properties of bituminous materials included under the item entitled "Refined Tar and Cut-Back Asphalt Cement for Cold Surface Treatment."

Preparation of Surface of Roadway.—After the surface of the roadway shall have been repaired, is well consolidated and free from holes or depressions, and when thoroughly dry,

it shall be swept clean of all dust, dirt or other loose material with horse or power-drawn brooms, and bass or other fine fiber brooms, or with stiff fiber hand brooms and bass or other fine fiber brooms. Newly constructed broken stone or gravel roads shall be subjected to traffic for at least one month before the construction of the bituminous surface thereon.

Application of Bituminous Material.—After the surface shall have been cleaned, and when thoroughly dry, the unheated bituminous material shall be uniformly applied to the prepared surface of the roadway by means of a pressure distributor as hereinafter specified, and in accordance with the directions of the engineer. The total amount of bituminous material to be used in the surface treatment shall be applied in one application, and shall not be less than $\frac{1}{8}$ nor more than $\frac{1}{2}$ gal. per sq. yd., the precise quantity being determined by the engineer.

Note: The first treatment of broken stone or gravel roads should consist of an application of between $\frac{1}{3}$ and $\frac{1}{2}$ gal. per sq. yd. Generally, subsequent treatments on the above types of roads and bituminous pavements should be less than $\frac{1}{3}$ gal. per sq. yd.

Pressure Distributor.—The pressure distributor employed shall be so designed and operated as to distribute the bituminous material specified uniformly under a pressure of not less than 20 nor more than 75 lb. per sq. in. in the amount and between the limits of temperature specified. It shall be supplied with an accurate pressure gauge so located as to be easily observed by the engineer while walking beside the distributor. It shall be so operated that, at the termination of each run, the bituminous material will be at once shut off. It shall be so designed that the normal width of application shall be not less than 6 ft. and so that it will be possible on either side of the machine to apply widths of not more than 2 ft. The distributor shall be provided with tires of widths dependent upon the following relationship between the pressure per square inch of tire and the diameter of the wheel: for a 2-ft. diameter wheel 500 lb. shall be the maximum pressure per lin. in. of width per wheel, an additional pressure of 30 lb. per in. being allowed for each additional 3 in. in diameter.

Application of Top Dressing.—Immediately after the completion of the application of the bituminous material from 15 to 22 lb. of broken stone chips, pea gravel, grit or other mineral matter which will meet the following requirements shall be uniformly spread, as directed by the engineer, over the surface of the bituminous material.

The broken stone, gravel, grit or other mineral matter shall consist of clean, hard, tough, durable material, free from soft or disintegrated particles, dirt, or other objectionable matter.

When tested by means of laboratory screens it shall meet the following requirements:

Passing $\frac{1}{2}$ -in. screen, not less than..... 85%
Retained on $\frac{1}{4}$ -in. screen, not less than..... 85%

Seasonal and Weather Limitations.—No bituminous material shall be applied when the air temperature in the shade is below 10° C. (50° F.), except by the written permission of the engineer.

Measurement and Payment.—The quantity of surface treatment to be paid for under this item shall be the number of square yards, measured horizontally, satisfactorily completed in accordance with the specifications. The price stipulated in this item shall include the furnishing and screening of the top dressing, the preparation of the roadway surface, the application of the bituminous material, and the spreading of the top dressing and all materials, work and expenses incidental to the completion of the surface treatments, except the furnishing of the bituminous material, which will be included for payment under the item entitled "Refined Tar and Cut-Back Asphalt Cement for Cold Surface Treatment."

Specifications for Refined Tars and Cut-Back Asphalt Cements for Cold Surface Treatments

Previous Service.—The contractor will be required to show to the satisfaction of the engineer that the company manufacturing the bituminous material he proposes to use under a given specification has, for a period of at least two years, manufactured bituminous material in a thoroughly equipped plant, and that the bituminous material which he proposes to use shall have been in continuous and successful use in the surface treatment of roadways for a period of at least two years previous to the date of the letting in which his proposal was submitted.

Refined Tar.

1. Its specific gravity at 25°/25° C. (77°/77° F.) shall not be less than 1.100, nor more than 1.140.

2. When tested by means of the Engler viscosimeter at 40° C. (104° F.), the specific viscosity of the first 50 cu. cm. passing the orifice of the viscosimeter shall be not less than 10 nor more than 35, with a maximum range of 5.

Note: Low specific viscosities should be used for northern states and high specific viscosities for southern states.

3. Its bitumen, as determined by its solubility in chemically pure carbon disulphide at room temperature, shall not be less than 90%.

4. When distilled according to the Am. Soc. Test. Mat. standard method, it shall yield not more than 5% of distillate at a temperature lower than 170° C. (338° F.); not more than 30% shall distill below 270° C. (518° F.), and not more than 40% shall distill below 300° C. (500° F.).

Cut-Back Asphalt Cement.—The cut-back asphalt cement shall consist of a mixture of asphalt cement and naphtha, which will comply with the following specifications:

1. Its specific gravity at 25°/25° C. (77°/77° F.) shall be not less than 0.890.

2. When 20 gm. of the material is maintained at a uniform temperature of 163° C. (325° F.) for 5 hours in an open cylindrical tin dish $5\frac{1}{2}$ cm. (about $2\frac{1}{4}$ in.) in diameter, with vertical sides measuring approximately $3\frac{1}{2}$ cm. (about $1\frac{1}{2}$ in.) in depth, the loss in weight shall be not less than 30%, nor more than 40%.

When tested with a standard No. 2 needle under a load of 100 gm. for 5 seconds at 25° C. (77° F.) the penetration of the residue, expressed in hundredths of a centimeter, shall be between 50 and 85.

3. When tested by means of the Engler viscosimeter at 25° C. (77° F.) the specific viscosity of the first 50 cu. cm. passing the orifice of the viscosimeter shall be not less than 25, nor more than 35.

4. When distilled according to the standard method of the Am. Soc. Test. Mat. the specific gravity of the distillate below 300° C. (572° F.) shall be not less than 0.730, nor more than 0.780.

5. Its bitumen, as determined by its solubility in chemically pure carbon disulphide at room temperature, shall be not less than 99.5%.

Delivery.—The bituminous material shall be delivered in suitable containers far enough in advance of its use in the work to permit the necessary tests to be made. Each container shall be plainly labeled with the trade name of the bituminous material, name of manufacturer, gross weight and net weight. Each shipment and each carload shall be kept separate.

Bills of Lading.—The contractor shall furnish the engineer bills of lading, or correct copies thereof, which shall state the trade name of the bituminous material, and the name and address of the company manufacturing and supplying it.

Samples.—Samples will be taken by the engineer from each carload of bituminous material when delivered at the work unless satisfactory arrangements can be made for sampling before shipment. Such samples shall be analyzed by the

engineer to assure the delivery of a bituminous material of the specified quality.

Work Included.—Under this item the contractor shall furnish and deliver on the work, at such points as directed, bituminous material which conforms with the specifications of either refined tar or cut-back asphalt cement, as specified.

Measurement and Payment.—The quantity of bituminous material to be paid for under this item shall be the number of gallons placed on the highway in accordance with the specifications and requirements, or used as directed for other purposes. Bituminous material that is wasted by the contractor shall not be included in the measurement under this item. The price stipulated in this item shall include the cost of furnishing, hauling and delivering the bituminous material on the work, and all expenses incidental thereto.

Subcommittee on Wood Block Paving

E. R. Dutton, Chairman

Since our meeting in Newark, October, 1916, no report has been made in regard to the specifications for creosoted wood block paving. At that time a complete specification was adopted by our society, and subsequent to its adoption several of the national societies adopted specifications almost identical in all the principal and fundamental parts. The only changes made in any of them were in regard to the specific gravity of the fractions, 235° to 315°, where it was raised from 1.02 to 1.03, and the 315° to 355° fractions where it was raised from 1.09 to 1.10. These changes applied both to the coal tar paving oil and to the coal tar distillate oil.

There were some minor changes in the methods of construction and the filler to be used, which did not affect the specifications as adopted by our society.

Under the stress of abnormal war times and the inability to obtain creosote oil there were recommendations made and adopted by the American Wood Preservers' Association at the 14th annual meeting of said society in Chicago, January, 1918, raising the specific gravity of the coal tar oil for paving blocks from 1.12 to 1.14 at 38° C. (See 1918 proceeding, pp. 171.) There was also a specification for a bituminous paint coat presented at said meeting and printed for information. These are about the only changes suggested or made in two years since our specifications were adopted, and we think it shows how good those specifications were. In regard to any suggested changes in our 1916 specifications, we do not think it would be wise or advisable at this time to make any changes except the following:

In paragraph five (5) on pp. 589 of the published proceedings of the 23rd annual convention held in Newark, October 10-13, 1916, we would suggest that said clause be made to read as follows:

"5. The specific gravity of the fraction between 235° C. and 315° C. shall be not less than 1.03 at 38°/15.5° C.

"The specific gravity of the fraction between 315° C. and 455° C. shall be not less than 1.10 at 38°/15.5° C.," and on pp. 590 of the same publication paragraph 5 under "Coal Tar Distillate Oil" shall be made to read the same as in above paragraph 5.

On pp. 593 under heading "Cushion" and sub-heading "A-Bituminous" only one method of obtaining a smooth surface on the concrete is recommended. From the practical experience in the last two years it has been found that a smooth surface can be made on the concrete material without the use of a mortar as therein specified. This surface may be obtained by several methods, either long handled floats, template rollers or belts, in fact any method that will produce the required smoothness, which shall not show a variation of more than $\frac{1}{4}$ in., using a straight-edge 5 ft. in length parallel with the curb line. The suggested changes would read as follows:

By inserting after the word "grade" where it appears in

the 10th line under the heading "Cushion" and sub-heading "A-Bituminous" published in the 1916 proceedings, pp. 593, the following:

"Any other approved method producing the required smooth surface on the concrete may be used," and in the same line after the word "Coating" insert the words, "or concrete."

With these suggested changes we think that your specifications will be fully up to date and perhaps a little advanced of existing specifications.

It would be very beneficial to the committee and to the society if the membership would offer suggestions for the improving of the specifications in any manner, or suggestions where investigations, tests and experiments might be made. There are any number of new problems presented to the engineer and chemist in these abnormal times, as there are lots of new materials produced and discovered by the manufacturers of materials to be used in the prosecution of the war, materials never dreamed of until produced as a by-product, and which may serve useful purposes in other ways. The committee should make further investigations in the use of water gas tar for paving blocks, and suggest any changes in the specifications on pp. 590, 1916 proceedings. On account of the high prices of materials entering into the creosoted wood block paving not as much work has been done in the last year, but it is desirable that the standard should be kept up and that this class of paving should not drop from its position as the leader in paving material.

Special Committee on Standard Tests for Bituminous Materials

A. H. Blanchard, Chairman

Your Committee on Standard Tests for Bituminous Materials herewith respectfully submits its 1918 report.

In its 1916 report the committee submitted conclusions relative to the properties of bituminous materials which should be covered in specifications by test requirements, and also recommended, by name, specific tests which could be used to determine some of the essential properties. Due to war conditions it has been impracticable to conduct conclusive research work relative to the standardization of new methods and appliances for valuating bituminous materials. The committee therefore believes that the tests at present in use must be relied upon until the time arrives when it will be advisable to carry on exhaustive laboratory and field investigations.

Your committee recommends that the society adopt methods of testing bituminous materials which have given useful, satisfactory and reliable results. It further considers that it is highly desirable that methods of conducting a given test in different laboratories should be as uniform as possible. Hence, it is obvious that, as far as practicable, methods of testing adopted by national organizations should be identical. Based on the above hypotheses, your committee has given careful consideration to the tests proposed by Committee D-4 on "Standard Tests for Road Materials" of the American Society for Testing Materials, and by the Special Committee on "Materials for Road Construction" of the American Society of Civil Engineers.

Your committee recommends that the society tentatively adopt until the next convention the following methods of testing under the conditions noted in each case:

Specific gravity test as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, pages 1448, 1449.

Flash point test as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, pages 1449, 1450.

Penetration test as described in the Am. Soc. Test. Mat., 1916 Standards, pages 530-532.

Viscosity test with Engler viscosimeter as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, pages 1452, 1453.

(Concluded on page 144)

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

E. L. POWERS
Editor

T. A. HULBERT
Managing Editor

150 NASSAU STREET
NEW YORK, N. Y.

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Copy for advertisements must reach the New York office by noon on Tuesday of the week before date of issue if proofs are to be submitted.

Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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Vol.
XVI

October 12, 1918

No.
15

LIBERTY BONDS AS INVESTMENTS

If there were no other reasons for buying Liberty Bonds to the limit, the opportunity to invest money safely and at a good interest rate should be a sufficient argument to buy.

The purchaser of Liberty Bonds acquires stock in the most prosperous concern in the world—the United States of America. His investment is as safe as an investment can possibly be, for, unless Germany should win, there is not the most remote possibility of loss. And if the unthinkable should happen and Germany win, everything would be lost anyway. The slogan, "It's billions for defense or billions for indemnity," is not an exaggeration. There can be no hesitation in choosing between lending to Uncle Sam and paying toll to the Kaiser.

The interest rate is attractive, especially to the man with only a little money to invest. It is higher than that paid by most savings banks, and practically as high as the average man can get without taking risks.

While the opportunity to make a safe and profitable investment should not be the compelling reason for buying Liberty Bond, it will not be overlooked, and shouldn't be.

THE PROPOSED ILLINOIS BOND ISSUE

Whether or not Illinois shall issue road bonds in the sum of \$60,000,000 will be decided by the voters of that state at the general election on the fifth of next month.

Governor Lowden and Ex-Governor Dunne are both ardent champions of the bond issue, and many state officials and influential men have declared in favor of the measure. The press of the state is urging the people to vote for the proposition; the Illinois Highway Improvement Association has worked hard to secure favorable action at the polls, and several agricultural organizations have endorsed the proposed step.

These factors in the situation point to a favorable vote—a result that would be most gratifying to those who have at heart the best interests of Illinois and the country as a whole. Good roads in Illinois, and in every other state, would go far toward solving the country's present problems and those to be met after the war.

The Illinois plan for the issuance of bonds has much to commend it to favor. It looks to no uncertain or indefinite source for the payment of the principal and interest, nor does it involve an unreasonably long term. The automobile fees have been so adjusted as to take care of the debt and leave a surplus, all within a period of 25 years. There can be no objection to the issue because of the war even on the part of those laboring under the delusion that road expenditures should be cut off, for Governor Lowden has given official assurance that no attempt to market the bonds will be made until after the war.

One of the arguments advanced in support of the bond issue is that it will be a measure of preparedness for peace. And that is a point upon which it would be difficult to place too much emphasis. There is almost as much need to prepare for peace as to prepare for war, and if the coming of peace is to find us ready we must make our preparations while we are still at war.

The impossibility of accurately forecasting conditions during the period immediately following the cessation of hostilities has been referred to in these columns. It seems certain, however, that the demobilization of an army of three or four million men will cause a large surplus of labor. Every provision for the absorption of that surplus that is made now will ease the inevitable strain of readjustment that will fall upon the country's resources. Public work can be utilized to take care of an enormous amount of labor, and with quite as much benefit to society at large as to the individual workers given employment. The advantage to the community would be especially marked if the labor were employed in the building of roads, for improved highways—always of vital importance to the nation's progress—will have a value in the development of the country's agriculture, commerce and industry during the first few years of peace that has never been approached heretofore.

The authors of the Illinois bond plan have prepared a practicable method of securing for the state a system of good roads, and various individuals and organizations have done their utmost to put the proposition before the people in a favorable light. By carrying the issue the people will make wise provision for the future.

Buy Liberty bonds, and keep them

Oregon Counties May Not Bid on Work Offered by the State Highway Commission, according to a ruling made by Attorney General Brown. The ruling holds that while a county has power to let contracts or to build its own roads, it has no authority beyond that given it by law and, therefore, has no power to bid on state road contracts.

Bell County, Texas, Is to Spend \$750,000 on its roads, according to a recent report. It is stated that the cotton crop in that county this season is one of the shortest in the county's history, and that as a result many farmers and farm laborers are temporarily out of work. It is planned to utilize this labor on the roads. Work has already been started on a highway between Temple and Belton.

The Paving Commission of Baltimore, Md., held its last regular meeting on Sept. 17, and has ended its work for the period of the war. An announcement of the commission's intention to take that action was made in "Good Roads" for Aug. 24. Mayor Preston, who is an exofficio member of the commission, offered a resolution at the meeting, commending the commission's work and expressing the thanks of the city, and Chairman S. C. Rowland submitted his final report, which was adopted.

Reports at the Convention of the American Society of Municipal Improvements

(Concluded from page 142)

Float test as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, pages 1453, 1454.

Ductility test as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, pages 1460, 1461 (eliminate testing at 4° C. [39° F.]).

Melting point of asphalt cements as described in the Am. Soc. Test. Mat., Proc. Vol. 16, 1916, pages 549, 550.

Melting point of tars as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, pages 1455, 1456.

Distillation test as described in the Am. Soc. Test. Mat., 1916 Standards, pages 540-543.

Fixed carbon as described in the Am. Chemical Soc. Journal, Vol. 21, 1899, page 1116.

In addition to the above methods your committee believes that methods for determining solubility in carbon disulphide, solubility of bitumen in carbon tetrachloride, solubility of bitumen in naphtha and a volatilization test should be standardized. As a basis for criticism it therefore recommends to the attention of the society the following descriptions:

Solubility in carbon disulphide as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, pages 1450-1452.

Solubility of bitumen in carbon tetrachloride as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, page 1452.

Solubility of bitumen in carbon tetrachloride as described in the Am. Soc. C. E. Trans., Vol. 82, 1918, page 1452, except that the solvent be 86° to 88° Baume paraffin naphtha, at least 85% distilling between 35° and 65° C.

Volatilization test as described in the Am. Soc. Test. Mat., 1916 Standards, pages 533, 534.

The committee requests that all specification committees and members of the society interested in tests for bituminous materials give careful consideration to the methods recommended and submit to the chairman of the committee, prior to July 1, 1919, criticisms and suggestions relative to the proposed methods of testing in order that the next convention may be in a position to adopt, as standards, methods of testing covering all test requirements included in the society's specifications for bituminous materials.

Put the "pay" into patriotism; buy bonds

Freight Rates on Road Materials Railroad Administration Refuses to Modify Order Increasing Tariffs on Stone, Gravel and Sand

The following statement relative to the freight rates on stone, gravel and sand has been authorized by Director General McAdoo of the Railroad Administration:

The Railroad Administration has given very careful and thorough consideration to applications from shippers of sand, gravel and crushed stone to modify the increases in freight rates brought about by General Order No. 28, by substituting some other basis for the uniform advance of 1% per 100 lb. provided in the order.

The conclusion has been reached that no other general basis can consistently be applied, but that in line with the announcement made by the Director General at the time General Order No. 28 was issued, consideration will be immediately given to all individual cases where the increases under the general order have brought about unnecessary hardships, or excessive rates, under existing conditions.

It is expected that the shippers who feel that the increased

rates brought about by the application of General Order No. 28 are excessive in specific instances will present applications for modification of such rates on these commodities to one of the several district freight traffic committees on which the shipping public is represented; these committees having been created since these applications were filed with the administration. The committees will be requested to give preferred attention to these applications.

Put your dollars into khaki; buy bonds

Idle Road Funds in New Jersey

War Conditions Prevent Utilization of Tax Collections Amounting to \$6,000,000

Because the conditions imposed by the war make it impossible for New Jersey to proceed with its road building program, about \$6,000,000 that will become available on Jan. 1, 1919, will have to remain unspent until after the war unless some radical change is made in the state law.

Under the Edge Law of 1917, there is levied an annual tax of one mill on the dollar. Last year the yield was about \$3,000,000 and this year's collections will amount to as much. The tax is to run three years more, and the funds raised must be expended in the construction of the roads in the state highway system. The decision of the Government to confine road operations within narrow limits has prevented the carrying out of the state's program of improvement, and various suggestions have been made for the use of the money. One of these contemplates its investment in Liberty Bonds, which would revert to the road fund after the war.

Keep the Hun on the run; buy bonds

Approval by United States Highways Council Sufficient

Attention of State Highway Officials Called to Statement by War Industries Board

The United States Highways Council has called the attention of state highway officials to the recent statement by the War Industries Board to the effect that highway projects approved by the council need not be submitted to the board for approval. This statement was printed in "Good Roads" for Oct. 5.

It is stated that over 6,000 applications for the approval of highway projects have been received by the council. It is also announced that the United States Employment Service is now represented in the membership of the council.

In response to inquiries from local highway officials the council has recently made the following rulings:

The council does not exercise jurisdiction over sidewalk construction.

Construction work, whether it costs more or less than \$2,500, should be submitted if it involves any of the materials under the control of the War Industries Board or the Fuel Administration. When materials are already on hand or are locally available, application for federal approval need not be made.

Buy bonds over here to win over there

Work on the Road Between the City Limits of St. Louis and Jefferson Barracks has recently been commenced. The work will cost about \$100,000, and will be paid for by the state and the county. The road is about 3 mi. long and will be paved with Warrenite. The grading is to be done by convict labor and the surfacing will be laid by the Granite Bituminous Paving Co. of St. Louis.

MEETINGS

Calendar of Coming Meetings

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

American Society of Municipal Improvements

The 24th annual convention of the American Society of Municipal Improvements was held at the Iroquois Hotel, Buffalo, N. Y., on Wednesday, Thursday and Friday of last week, October 3, 4 and 5.

The sessions were devoted chiefly to the reception of committee reports and to the presentation of papers, a schedule of which was printed in "Good Roads" for Sept. 28. Some changes in the order of events were made, the schedule referred to having been taken from the advance program.

The election of officers took place on Thursday evening, and resulted as follows: President, Elbridge R. Conant, Savannah, Ga.; First Vice President, George H. Norton, Buffalo, N. Y.; Second Vice President, Maj. R. Keith Compton, C. E., U. S. A., formerly of Baltimore, Md.; Third Vice President, Capt. Wm. Hardee, New Orleans, La.; Secretary, C. C. Brown, Bloomington, Ill.; Treasurer, F. J. Cellarius, Dayton, Ohio.

On Friday afternoon a long automobile trip was made, and in the evening there was a smoker.

The report of the Committee on Resolutions, as adopted, follows:

RESOLVED: That the American Society of Municipal Improvements, in convention assembled, does hereby express its deep feeling of appreciation of the courtesies extended to it by the City Government of Buffalo, as exercised through its Mayor, its Commissioner of Public Works and its City Engineer, the General Local Committee and the Special Local Committee, and for the entertainment furnished its members and visiting ladies.

WHEREAS, The Federal Government has created the War Industries Board, the Priorities Commission, the Railroad Administration, the Fuel Administration, the Capital Issues Committee and the United States Highways Council, whose duties include the conservation of materials, transportation, labor and money for the successful prosecution of the war,

BE IT RESOLVED: That the American Society of Municipal Improvements, in convention assembled, expresses its desire to cooperate to the fullest extent with these Government agencies in all measures which may hasten the winning of the war, and requests that individual engineers exert their influence toward deferring all public improvements, which, although perhaps of considerable local importance, should not be considered as essential under war conditions.

WHEREAS, War conditions have curtailed the construction and reconstruction of important public improvements, and

WHEREAS, Large public improvements require considerable time for the development of adequate plans, therefore

BE IT RESOLVED: That the American Society of Municipal Improvements, in convention assembled, believes that state, county and municipal governments should undertake at once the planning of important public works which it may be practicable to construct soon after the declaration of peace.

WHEREAS, The Government of Great Britain has appointed a ministry to consider the problems of reconstruction which will have to be solved after the termination of the war, be it

RESOLVED: That the American Society of Municipal Improvements, in convention assembled, request the President of the United States to appoint a similar commission to cooperate with the British ministry.

WHEREAS, The general embargo placed on highway materials and the restricted labor situation throughout the United States have resulted in a very large curtailment in the necessary maintenance of the highway systems of states, counties and municipalities at present constructed, and in which there have been invested millions of dollars, and

WHEREAS, The continued lack of proper maintenance will result in the rapid deterioration, destruction and ultimate loss of the vast sums invested, be it

RESOLVED: That the American Society of Municipal Improvements, in convention assembled, requests careful consideration by the United States Highways Council and the various state highway departments of the urgent necessity for greater latitude in the release of highway materials, so that the highway systems may be maintained against destructive loss, and, be it further

RESOLVED: That a copy of these resolutions be sent to the United States Highways Council and to each of the state highway departments.

Cooley Highway Association

An organization named the Cooley Highway Association, in honor of George W. Cooley, formerly state highway commissioner of Minnesota, was formed at a meeting at Osakis, Minn., on Sept. 27.

The object of the association is to promote the construction of the Cooley Highway from Grand Rapids, Minn., to Sisseton, S. D. The route is a combination of the two projected routes known as the "Clover Leaf Route" and the "Brainerd-Osakis-Sisseton Cut-Off." It will pass through Cohasset, Remer, Brainerd, Barrows, Crow Wing, Lennon, Fort Ripley, Little Falls, Swanville, Osakis, Nelson, Alexandria, Forado, Glenwood, Starbuck, Cyrus, Morris, Alberta, Chokio, Johnson, Granville, Barry and Brown's Valley, Minn.

Besides naming the highway and the association in Mr. Cooley's honor there was formed at the meeting the "George W. Cooley Appreciation Fund Association," with the object of presenting Mr. Cooley with a more substantial evidence of appreciation.

The officers of the association are: President, E. R. Ruggles, Osakis; Secretary, Arthur Irgens, Glenwood, and Treasurer, W. E. Olson, Little Falls. In addition to these officers there are to be two vice presidents, one elected by the Grand Rapids Commercial Club and one by the Sisseton Commercial Club, and a director elected in each town through which the highway passes.

A convention of the Burlington Way Good Roads Association was held at Rock Island, Ill., on Sept. 27. Among the resolutions passed at the meeting was one pledging the association's support of pending state bond issues.

Bonds speak louder than words; buy bonds

Kay County, Kansas, has a balance of \$95,000 in the road fund, according to a recent report made by Carl Mitchell, Chairman of the Board of County Commissioners. It is expected that a portion of the money will be used for the construction of a hard-surfaced road from Newkirk to the oil fields about 8 mi. southeast of the city.

PERSONAL MENTION

C. A. Poole, City Engineer of Rochester, N. Y., has been commissioned a captain in the Engineer Corps.

W. P. Danford, Assistant State Engineer of Oklahoma, has left the Department of Highways to become a first lieutenant in the Engineer Corps, U. S. Army.

John F. Skinner, Principal Assistant City Engineer of Rochester, N. Y., has been commissioned a captain in the Construction Division of the Army.

W. H. Johnson, formerly an engineer with the California State Highway Commission, has been commissioned a first lieutenant in the Engineer Corps of the Army.

Maj. Joseph W. Shirley, Chief Engineer of the Topographical Survey of the City of Baltimore, Md., has been appointed chairman of the Annex Planning Commission of that city.

Paul Sullivan, Assistant City Engineer of Cincinnati, Ohio, has been commissioned a first lieutenant in the Engineer Corps, U. S. Army. Lieut. Sullivan was in charge of the work of street and sewer repair.

Frank L. Bennett has resigned as commissioner of public works of Chicago, Ill., and has been appointed director of the Illinois Department of Public Works and Buildings to succeed the late Leslie D. Puterbaugh.

E. M. Hoopes, Jr., formerly city engineer of Wilmington, Del., has been commissioned a captain in the Quartermaster Corps of the Army. His resignation to enter Government service was noted in this column in August.

PUBLICATION

SOMERVILLE, MASS., STREET COMMISSIONER. Annual report for the year of 1917. Paper, 6x9, 29 pages and covers.

This report consists largely of tables showing details of the work performed by the highway department of the city during the calendar year of 1917. The principal table, occupying nearly half of the report, shows the location, length and width of all public and private streets in the city.

ONTARIO, CANADA, DEPARTMENT OF PUBLIC HIGHWAYS. Annual report for the year of 1917. Paper, 6½x9½ in., 80 pages and covers, illustrated.

Included in this report is a detailed statement of the work of the provincial highway department, in which much less reliance is placed upon tabular statements than is usual in reports of this nature. Among the topics given attention in the main portion of the report are the following: County roads as a war measure; suburban road systems; the provincial highway; motor vehicle traffic; county road organization; heavy traffic highways, and recent road legislation. Appendices A and B are tables of expenditures. Appendix C is a series of reports on county road inspections. Appendix D is the report of the chief engineer. The report is illustrated by a number of halftones of roads and bridges built and under construction.

Liberty Bonds or German taxes

Missouri Has Made Wonderful Strides in Road Work during the past year in spite of the handicaps of war, according to a recent statement by E. L. Sanford, of the

State Highway Commission. The work covered by applications made for state and federal aid will cost over \$4,000,000, it is stated, and more than 100 projects have been started in 70 of the counties of the state.

The Western Run Turnpike Co., Inc., through its president, Joshua G. Bosley, filed a petition last week in the Circuit Court at Towson, Md., asking for its dissolution. For some fifty years the company has maintained a turnpike road extending from the York road, through the village of Butler in the fifth district of Baltimore County. This action is in accordance with a recent meeting of the stockholders of the company, at which time it was decided to turn the road over to the county commissioners as a free road.

Changes in the Alabama Road Laws have been suggested by the legislative committee of the Alabama Good Roads Association. At a recent meeting at Birmingham, the following resolution was adopted: "Be It Resolved, by the Legislative Committee of the Alabama Good Roads Association: That while this committee has met in pursuance to its duty in order to suggest laws to perfect a better road system in the state of Alabama, we do not assume, in so doing, autocratic power and welcome suggestions and the cooperation of all members of the Legislature and especially of the Governor of Alabama, Lieutenant Governor and Speaker of the House of Representatives."

For Foch and freedom; buy bonds

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS, OF AUG. 24, 1912, OF "GOOD ROADS," published weekly at

New York, N. Y., for Oct. 1, 1918.
State of New York, County of New York, ss:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared E. L. Powers, who, having been duly sworn according to law, deposes and says that he is the Editor of "Good Roads," and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher.—The E. L. Powers Co. (Inc.), 150 Nassau Street, New York, N. Y.

Editor.—E. L. Powers, 150 Nassau Street, New York, N. Y.
Managing Editor.—T. A. Hulbert, 150 Nassau Street, New York, N. Y.

Business Manager.—E. L. Powers, 150 Nassau Street, New York, N. Y.

2. That the owners are:

The E. L. Powers Company (Inc.), 150 Nassau Street, New York, N. Y.

E. L. Powers, President and Treasurer, 150 Nassau Street, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: No bondholders, mortgagees or other security holders.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only).

E. L. POWERS, Editor.

Sworn to and subscribed before me this 30th day of September, 1918.

(Seal) J. FREDERICK CRYER,

Notary Public, N. Y. C.

(My commission expires March 30, 1919.)

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, OCTOBER 19, 1918

Number
16

Keep the Commercial Highways Open!

An Appeal to County Authorities in Colorado that is Applicable to Every Road Official in the country*

By T. J. EHRHART†

Every bushel of grain, every pound of our agricultural products, almost every ton of metaliferous ore, in short, practically every product of Colorado must be transported over the roads at some time if it is to be used in winning the war.

Every strip of impassable road cuts down transportation and distribution of products and renders inefficient Colorado's labor in just the proportion of goods carried along that particular bit of highway.

Production is an essential to the winning of the war and it follows, logically and unmistakably, that if this state is to

The time is approaching when the counties will make their road levies for 1919, and it is the writer's earnest plea that every county commissioner in the state will do the utmost within his power to maintain road levies in the case of those now at high level, and to raise these levies wherever they are now at a low mark.

In times like the present the inclination is to economize in expenditures wherever possible, and it is a reasonable desire.

But there is a sharp distinction between true and false



Continental Divide, Tennessee Pass, Col.



At Redcliffe, Colorado.

SECTIONS OF THE PIKE'S PEAK OCEAN-TO-OCEAN HIGHWAY.

be geared up to its highest efficiency every one of our commercial arteries must be kept in the best possible condition during the war. Bad roads are a menace to the prosperity of the community in times of peace. In times of war they become a direct blow at the welfare of the entire country.

*From the "Colorado Highways Bulletin" of the Colorado Highway Department, October, 1918.

†State Highway Commissioner of Colorado.

economy, and it should be made in the case of road building.

We must have good roads. The Government is calling now upon every possible agency for an increased use of the highways and this winter will see an enormous stimulus in motor truck transportation. We are told that there will probably be embargoes on railroad lines, and if this is true the matter of communication will rest finally upon the highways.

Every county commissioner knows what the effect of heavy motor truck travel is upon the roads. He knows that the highways will be cut to pieces in a short time, but he knows also that transportation must go on if the country is to win this war.

The time for consideration of this problem is the present moment. The general public will perhaps not come to a realization of the need until the damage is done. It remains for the road officials to be prepared.

The best preparation is adequate funds and where possible the present building up of road gangs which can cope with the coming emergency.

The state highway fund is not adequate to meet the situation, but it will be employed to the utmost value of every dollar. The Legislature will also be requested to pass upon emergency measures which will aid the situation, yet these at the best will not serve to do more than supplement the efforts of the counties.

The case is one for cooperation and team work raised to the nth degree. It calls for increased effort in the face of war conditions which make both labor and funds difficult to secure.

May I suggest to the county commissioners that the subject is one calling for their most serious consideration as a positive, win-the-war measure?

Only by concentrating all of our resources to the work can we hope to push the war to an early conclusion. Colorado's major part now must be in geared-up production transported over the highways of the state, and those highways must be in shape to bear the enormous increase in traffic.

Interstate Bridge at Philadelphia

New Jersey Commission Favors Bridge Instead of Tunnel to Take Care of Traffic Between Pennsylvania and South Jersey

The New Jersey Interstate Bridge and Tunnel Commission has concluded that a bridge instead of a tunnel is the only feasible means of taking care of the traffic between New Jersey and Pennsylvania at Philadelphia. It is understood that a tunnel has been advocated by some interests.

It is pointed out that a tunnel would not meet the demands of the heavy motor truck traffic between the two states, and that a bridge is what has been planned from the first. New Jersey is said to be ready to go ahead with the project as soon as Pennsylvania takes the necessary action.

Highways After the War

Congressman Points Out Need of Preparing Now for Conditions to Come

The prosperity of the United States after the war will be determined, in large part, by the available mileage of improved roads, according to the belief of Congressman T. W. Sims of Tennessee, Chairman of the House Committee on Interstate and Foreign Commerce.

He believes that modern roads will be required for a heavy traffic of motor trucks, and is convinced that a definite national highway policy should be formulated at the earliest moment and that to administer that policy there should be appointed a thoroughly qualified board with ample power to act. In discussing the situation, Mr. Sims said, in part:

"Plans for our national highways should be carefully evolved and carried out with mature consideration of the numerous factors involved. We should have no promiscuous improvement of highways where they will be of little value. They must be planned with a view to making them of the highest military and economic importance—by linking the states to one another more closely than ever before and with the thought of making the permanent federal highways prime assets to interstate and foreign commerce."

Holes in the Public Roads

Commissioner Wiley of Kentucky Points Out the Necessity for Continuous Maintenance

"A road is the means of transportation," said Commissioner Rodman Wiley of the Kentucky Department of Public Roads, in a recent statement, "and upon the condition of the surface depends the cost of transporting materials."

"A great many people think that when a road is once built it will stand for all time and do efficient work without any repairs. But such is not the case. Railroads, rivers, harbors and canals are patrolled, and inasmuch as the highways are subject to more severe traffic than any of the above it stands to reason that they should receive constant attention. Besides, if the road is not smooth not only is the cost of hauling increased but vehicles are caused to deteriorate more rapidly."

Commissioner Wiley then illustrates the point by showing the effect of holes in a road. Assuming that the damage to an automobile passing over a hole is one cent and that there are 50 holes in a mile of road traversed by 100 automobiles daily, he points out that the damage done would amount to \$50 a day or \$1,500 a month. In a year this would be \$18,000—enough to build a mile of good road. Continuing, he said:

"It would seem to me that it is now high time that steps be taken to at least see that all the holes in the roads are kept filled. One way would be to appoint patrolmen on all the main roads in the county."

"I cannot believe that we will very much longer be willing to see each day thousands of dollars' worth of damage done to property."

"The proposition is worth serious thought."

To Buy Army Motors and Vehicles

War Department Announces Creation of New Division to Handle Purchases for Army

A motors and vehicles division has been organized in the office of the director of purchase of the War Department, according to a recent announcement from the office of Brig.-Gen. R. E. Wood, Acting Quartermaster General.

The new division will have authority and responsibility for the procurement of all motor-driven, horse-drawn and hand-drawn vehicles for the War Department. It has been placed in charge of Col. Fred Glover. It will be divided into two branches, one known as the motors branch and the other as the vehicles branch. The former will be under Col. Edwin S. George and the latter under Col. R. W. Lea.

Return Loads Principle for Passenger Automobiles

The application of the return loads bureau plan to passenger car travel between towns connected by improved highways has been suggested by C. T. Silver, Metropolitan Distributor of the Kissel Motor Car Co.

Mr. Silver pointed out that there are companies operating passenger automobiles between cities and adjacent suburban districts on regular schedules and suggests that arrangements could easily be made which would insure loads in both directions. This would enable the company to keep its rates at a reasonable figure and still make good profits.

The Authorities of Monroe County, New York, have been obliged to undertake a campaign against violators of the law requiring the display of lights on vehicles using the public roads at night. Most of the offenders, it is said, are drivers of horse-drawn vehicles. The failure to carry lights has resulted in a number of accidents.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

E. L. POWERS
Editor

T. A. HULBERT
Managing Editor

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Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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USE THE HUN FOR HIGHWAY CONSTRUCTION

Owing to the shortage of labor, the use of prisoners on highway work is increasing in several of the states. We have suggested that the German prisoners should be utilized for this work. At the rate these prisoners are now being taken, it would seem to be the logical thing for them to be employed in the U. S. for work on the highways. Nothing, in our opinion, could be of greater benefit to the country in general than their use in this way.

SCHEDULES FOR HIGHWAY PROJECTS REQUIRED

The United States Highways Council addressed a letter last month to the several state highway departments directing them to secure complete schedules covering all projects of road and street construction, reconstruction, maintenance and resurfacing in states, counties, cities and townships for the year of 1919. Under this plan all projects will be reviewed by the state highway department and, if approved, will then be transmitted to the U. S. Highways Council for consideration by that body on, or before, December 10th next.

Unless the war suddenly comes to an end, or there is some other radical change in the present situation, the proposed plan means that all highway work for the year 1919 must be approved in this way or it cannot proceed. The time allowed engineers and officials is very short and it is necessary that cooperation should be given without delay in order that no important highway project shall fail to be duly considered.

It is requested by the U. S. Highways Council that each state highway department prepare forms for transmission to the proper state, county, city and township officials upon which the required data are to be reported. Maps, wherever possible, should accompany the report in order to show the relation of the proposed project to other highways.

Separate blanks for the construction, reconstruction, maintenance, resurfacing and each kind of work are required to be submitted to the state highway department by each county, township and city. In view of the shortness of time allowed, highway officials should send in the desired information promptly. If blanks are not available officials are urged to get into correspondence with the highway

department at once, keeping in mind that the information desired embodies the following:

Proposed projects for the year 1919 must fall within the description of Bulletin No. 1 of the U. S. Highways Council.

Approval will be considered for: 1st, highways of military importance; 2d, highways of national economic importance; 3d, highways of unfinished construction, which cannot be postponed another year; 4th, highways of such local importance that it would cause great hardship if construction were delayed.

Unfinished work must be reported for approval so that same may be approved and the work allowed to proceed.

KEEPING THE HIGHWAYS OPEN.

In our issue of September 14th we published an article entitled "Making Provision for Winter Highway Traffic." The article covered very completely the different methods employed last winter in removing snow from the highways and thereby keeping them open for the unusual traffic brought about by the war.

It was pointed out in that issue that the greatly increased traffic occasioned by the use of the motor truck for hauling war materials, food and other commodities essential to the prosecution of the war would necessitate keeping the highways open and naturally entail additional responsibilities upon state and municipal officials. Since the publication of the article referred to, reports have come to hand showing that highway and street officials fully realize the necessity for keeping the highways free from snow and are taking the steps necessary to that end.

Mr. Ehrhart, in his article on another page of this week's issue, shows what has been done in the state of Colorado and calls attention to the necessity for keeping the commercial highways open. The article will serve to emphasize the desirability of taking steps everywhere so that highway transportation shall not be hampered.

The Highways Transport Committee of the Council of National Defense is cooperating with the various state highway departments with a view to giving all the assistance possible for the removal of snow along convoy routes in the north and middle western states to the seaboard. It is understood that Lieut. Col. Uhler, of the Highway Transport Corps, has outlined a complete plan of motor transportation over three main motor truck routes. One of these routes starts from Chicago, one from Detroit and another from Buffalo, all of them converging at Baltimore.

Too much emphasis cannot be placed upon the necessity for planning the work of snow removal now. Winter is close at hand and snow storms may be expected at any time. Financial appropriations, if not already made, should be looked after promptly while the necessary snow handling equipment should be ordered without delay.

Mudshell Is Growing in Favor as a Road Material in the State of Texas, according to a recent report. Over 334,000 cu. yd. were used in south Texas during the year.

Union Labor in Chicago Has Endorsed the Illinois Road Bond Issue, according to recent advices from that city. The Chicago Federation of Labor and Typographical Union No. 16 have adopted resolution favoring the issue, and stating that: "The proposition is of such general interest in a social, economic and educational way that labor recognizes the benefits from an improved system of hard-surfaced roads." Labor organizations outside the city have also indicated their approval of the bonds, among these organizations being the United Mine Workers of Illinois, the Trade and Labor Assembly of Quincy, the Trade and Labor Assembly of Bloomington, and various locals of the Order of Railway Conductors, the Brotherhood of Locomotive Engineers, the Brotherhood of Railway Trainmen and the Brotherhood of Locomotive Firemen and Enginemen.

Massachusetts Highway Association

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Announcement

This section of the paper is open to members of the Massachusetts Highway Association for the discussion of matters directly connected with road interests. Members are requested to submit items of interest for use in this column.

Address all communications to GOOD ROADS, P. O. Box 2705, Boston.

The following announcement, effective October 1st, will interest members of the Association:

"That part of the Texas Company's asphalt and road oil business heretofore conducted in the name of its special agent, John Baker, Jr., will be conducted in the name of The Texas Company Asphalt Department, to which all correspondence and orders should be addressed and all remittances made."

We have received no details as to any changes that may be made in the policy of the company, but it is quite certain that Gus Kennedy and Martin Fisher will still be with us.

Arlington's tax rate will be \$24.20, a reduction of \$1.30. The town's total valuation is \$19,800,998, an increase of \$519,586. Real estate is valued at \$18,041,867, a gain of \$428,572. Personal estate, valued at \$1,759,131, gained \$91,014 during the year.

The town has 5,131 poll taxpayers compared with 4,972 last year. The income tax from the state amounts to \$47,161 as against \$37,392 in 1917.

The new tax rate for Malden is \$24.20, an increase of \$1.10 over last year. The real estate valuation has gone up from \$34,715,900 to \$34,964,000, and the personal property from \$5,131,997 to \$5,847,590. The total has increased from \$39,847,897 to \$40,811,590. The number of polls shows a falling off of 500 because of the men who have gone into military service. Increased expenses, are the reasons assigned for the addition to the tax rate. A new central fire station, costing about \$91,000, is one of the principal items.

Lynn's tax rate for this year will be \$21.80, which is \$1.20 less than last year. This announcement was made by the Lynn Board of Assessors.

There is an increase in the personal property of the city of \$4,425,752, and an increase in real estate of \$3,923,185.

The total valuation of the city is now \$98,270,107. The total receipts from polls, income tax and valuation amount is \$2,338,530. The year's total appropriations will be \$2,319,925.

It is announced by the assessors that the tax rate might have been \$2 less had it not been for the fact that there was a \$75,000 increase in wages of city employees; a \$50,000 increase in state aid; \$28,000 for cutting and supplying wood; \$23,000 for old claims from a former administration; \$20,000 in lowering the interest charges, and also that the city received \$45,000 less this year from the income tax distribution than it did last year.

The residents of Peabody were pleased when they learned from Mayor Donnell that the city's tax rate will be kept down to \$16, an increase of only \$1, despite the fact that \$200,000 has been expended in building permanent streets. Of the street money one-half was taken out of the taxes this year and one-half last year, so that no bond issue was necessary. The rate of \$16 compares with \$26.50 in Salem and \$20.80 in Danvers, the adjoining municipalities.

An increase of \$1.50 in the Cambridge tax rate for 1918 was announced today by the assessors, the new rate being \$25. The increase, somewhat smaller than had been expected, is attributed to various causes. There was an increase of \$22,465.93 in state, county and metropolitan taxes; an increase of \$79,083.64 for the school department, and an increase of \$58,700 in retirements of serial loans issued prior to Jan. 1, 1917. Interest charges required \$7,003.70 more than last year. In 1917 there was a special assessment for street watering amounting to \$35,847.97. This expense has been included in the regular tax this year, and accounts for 27 ct. of the increase in the rate. Under the act which requires cities to provide for deficits in tax levies of previous years Cambridge this year includes in the tax warrant the amount of \$23,565.25, representing the total deficits for 1911 to 1917 inclusive.

Francis T. McAvoy, of the engineering department of the Massachusetts Highway Commission, is now at Camp Jackson, Columbia, South Carolina.

The next meeting of the Massachusetts Highway Association will be on Thursday, November 14, and will probably be held at the American House in Boston.

We regret to announce that Thomas F. Cook, assistant superintendent of streets in Brookline, died on October 6th, at his home, 142 Davis avenue, after a week's illness, from pneumonia. He was born in Brookline in 1881, the son of the late Mr. and Mrs. John Cook. He was graduated from the Brookline High School in 1899 and entered the employ of the Bay State Street Railway Company after his graduation. About sixteen years ago he was appointed clerk in the building department of Brookline and eight years ago was chosen assistant superintendent of streets. He was for a number of years financial secretary of Brookline Council, K. of C., also of the Bishop Cheverus Council, B. of C., and of the Brookline lodge of Elks. He leaves a wife, who was Miss Helen Ready of Brighton, and a young son. He leaves also a brother, Joseph F. Cook, registrar of voters of Brookline, and four sisters, Mrs. Walter J. Cusick, Mrs. John Riley, Miss Ellen Cook and Miss Gertrude Cook, all of Brookline.

Mr. Cook was one of the really popular members of the Association, and we know of no other of the younger men in the road building profession who had more friends or who was more highly esteemed by his associates, and his pleasant and cheerful presence will be greatly missed from our meetings.

George M. Stevens, of the Central Construction Company, died from double pneumonia on September 19th, after a very short illness. He was born in Westboro, Massachusetts, on February 2, 1875, and moved to Roxbury when a child, where he attended the public schools and graduated from the Roxbury High School.

Mr. Stevens was with the Boston Transit Commission until 1896, when he entered the engineering department of the city of Boston, where he remained for about twelve years. In 1908 he entered the employ of the Mack Manufacturing Company of Philadelphia as a salesman of paving brick, and he was also a salesman for the Bermuda Asphalt Company. For the past six years he has been connected with the Central Construction Company of Roxbury.

Mr. Stevens was married and leaves a wife and two daughters, aged nine and five years. He was a member of the Boston Chamber of Commerce, American Society of Civil Engineers, and Boston Lodge of Elks.

George Reinhart, who recently died in Boston very suddenly of pneumonia, will be remembered by the older road builders in The Association as having been in charge of the office of the Texas Company at Providence when asphaltic materials came into common use for highways some twelve or fourteen years ago.

Mr. Reinhart did not remain long in the road material department of his company, but was given charge of the distribution of gasoline, kerosene and lubricating oils for The Texas Company in the New England States.

On October 3d, City Engineer and Acting Superintendent of Public Works George R. Burnes died of pneumonia after a short illness. This death in the official circles of the city is deeply felt by everybody.

On January of this year the Revere public works department was placed in his charge and he was appointed acting superintendent of public works by Mayor Hall, to succeed Lieutenant Richmond, who went into the army service at that time. He has served in that position until his death, having also been appointed city engineer and confirmed in that place by the City Council.

He received a degree in civil engineering from Massachusetts Institute of Technology. Previous to coming to Revere he worked in the engineering department of the City of Chelsea. In 1915 he was appointed assistant city engineer, and in November of the same year assumed the duties of assistant superintendent of public works, in charge of the highway division. He was a member of the Boston Society of Civil Engineers and Massachusetts Highway Association.

Mr. Burnes was a native of Salem, but had spent most of his life in Chelsea, attending the Carter School and the Chelsea High School. He was 28 years of age, married, and leaves two children.

New Hampshire Good Roads Association

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The quarterly meeting of the N. H. Good Roads Association was held at Lebanon on September 19, but on account of heavy rains just previous to this date and the muddy condition of the roads in some sections, there was not as large an attendance as had been looked for.

At the business meeting it was announced that President Charles A. French had been commissioned a captain in the U. S. Quartermaster's Dept., and that Secretary Winn had also entered government service and his resignation as an officer of the Association was accepted and Will B. Howe was appointed Secretary-Treasurer pro tem.

The Board of Trade of Lebanon furnished automobiles to take the members and guests to Hanover, where the student military corps gave an interesting exhibition drill.

Dinner was served at the Hotel Rogers and the following list of speakers were heard: David H. Foster, Chairman of the Lebanon Board of Selectmen; Olin H. Chase, N. H. Commission of Motor Vehicles; Prof. Charles A. Holden, Director of the Thayer School, and the Rev. John W. Barker. After the meeting adjourned the party attended the ceremonies incident to the raising of a municipal flag.

George P. Winn, City Engineer of Nashua, has been granted six months' leave of absence by the Board of Public Works and is now located at Bath, Maine. Ovid F. Winslow, Superintendent of Streets, has been placed in charge of the Engineering Department while Mr. Winn is away.

Winslow & Cummings Contracting Company have just completed about four miles of modified Topeka re-surfacing on the state highway south of the Nashua city limits to the Massachusetts state line.

John Slavin, foreman of the street department of Nashua, passed away recently after a short illness. He had been employed in the Street Department for about four years.

The City of Nashua has just completed about eleven thousand square yards of modified Topeka re-surfacing on Temple Street and cement gutters have also been installed. William Street is being paved with the same material.

The next meeting of the New Hampshire Good Roads Association is to be held in Nashua in December. The date will be decided upon later and each member will be notified. It is hoped that there will be a large attendance at this meeting, as several applications for membership have been received and other matters of importance will come before this meeting.

F. C. Everett of the State Highway Commission is arranging a war map at the request of the Fourth Liberty Loan committee of Concord, N. H. The map is to be drawn up by Fred H. Coburn, Division Engineer, assisted by F. F. Hargraves, and will show the exact location of the present battle lines. It is to be exhibited in a store window on the main street, and it is expected that it will boost the purchase of the Fourth Liberty Loan bonds. The committee is under the impression that the people think the war is over, and in order to show how far the Yankees are from Berlin this map is to be placed on exhibition.

The office force of the State Highway Department and division engineers and foremen have been inoculated by the State Board of Health as a preventive of influenza.

All state aid throughout the State of New Hampshire has been suspended by the order of the Public Safety Committee. Trunk line construction will be allowed to continue until November 1st and after that date no new work will be started. This does not include maintenance.

The City of Concord is contemplating partially motorizing the highway department and the Mayor and Superintendent of Streets are looking up the matter of light weight trucks.

The N. H. State Highway Department have occasional notes from their employees who are in the service. Private Richard W. Brown, Medical Dept., 103d Field Artillery, has been cited for bravery for tending wounded soldiers under fire.

Private Leroy F. Johnson, Company B, 101st Engineers, has been gassed twice and is now reported as recovering in the hospital.

Lieut. Harold V. Clarke, Field Artillery, U. S. Army, has passed successfully the final examinations in one school for non-coms., and three schools for commissioned officers.

Wallace F. Purrington, chemist, is now Chief Sanitary Inspector for the U. S. Health Department and is stationed at New London, Conn.

Prof. J. W. Goldthwaite, geologist, is now a captain in the office of the Chief of Staff, War Department, Washington, D. C.

Philip S. Day, an assistant, is now a captain and an instructor at West Point.

A. E. White, Second Lieutenant Infantry, is at Camp Devens.

James K. Sanborn, lieutenant, graduated from the Officers' Training School at Plattsburg, is now an instructor at Lehigh University, Penn.

Harold Clement is at Camp Devens.

Harvey Chadwick is in the machinist section of the Aviation Corp.

Gaylord Cummings, of the infantry, is at Camp Devens.

New Hampshire's first experiment in cement concrete construction is being made by the State Highway Dept. in the town of Hooksett, where a section of concrete road is being built on force account basis. A 22-ft. rockring mixer is used and all the latest approved methods are being employed, such as concrete roller, belt, etc. The mixture is 1:2:4 and the finished road is 16 ft. wide. The foundation is thoroughly drained by a system of side drains which are working very successfully.

New York State Road Builders' Association

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Harry P. Condon, Chief Clerk of the State Highway Department, is enjoying a well-earned vacation of a few weeks.

Up to the present writing the staff of the State Highway Department has escaped Spanish influenza. Some of the employees are at home taking care of colds with the "ounce of prevention."

Charles Abram Post, whose death occurred at his home in Catskill during the past month, was sheriff of Greene County. His first public office was that of commissioner of highways of the Town of Catskill.

The great warehouse that has been in the course of construction at the Barge Canal Terminal in North Albany has been completed, and will soon be ready to receive the merchandise coming into Albany over the state's canal system.

Joseph Odell, of the State Highway Department, has received a very interesting letter from his brother, Lieut. Odell, who is at the front. In the letter, Lieut. Odell mentions meeting Lieut. A. M. Snow, formerly of the State Highway Department, who is now in command of "Company B."

An open air meeting for the sale of Liberty Bonds held on the Government construction work at South Schenectady resulted in the disposal of over \$125,000 worth. The meeting was in charge of John H. Gordon, General Manager of the Feeney & Sheehan Construction Co., the contractors on the work, and Major Smith, of the U. S. Army.

State Highway Commissioner Edwin Duffey, chairman of the 4th Liberty Loan Committee of the state departments, has reported the sale of bonds to the amount of \$621,900. Two departments, the office of the Miscellaneous Reporter and the Highway Department, achieved 100%. The sub-

scriptions from the State Highway Department amounted to \$54,150.

At a meeting held in Syracuse last week, State Highway Commissioner Duffey explained to the State Council of Defense the plans made for the removal of snow from the through state highway routes used for sending Army motor trucks from the West to the Coast for shipment to France. Commissioner Duffey said that there was no doubt that the through routes could be kept clear for the trucks.

This fall will mark the completion of work on the bottom course of Section 2 of the Schenectady-Duanesburg Road, extending from the Schenectady County line to Duanesburg Corners. The remainder of the work will probably be completed during the coming year. The work is under the direction of Thomas M. Brown, of Schenectady, a member of the contracting firm of Brown & Lowe. The road will be a little more than 5½ mi. long when finished.

Edwin Duffey, State Commissioner of Highways, will attend the annual convention of the New York State Automobile Association at Utica on Oct. 23 and 24. Governor Whitman and Secretary of State Hugo are also expected to be present. The principal subject on the program is the sale of the Barge Canal to the United States Government. The proceeds of the sale will be used for the extension and completion of the highway system of the state. Other matters of importance to users of the highways of the state will also be taken up at the meeting.

General Manager John H. Gordon, of the Feeney & Sheehan Construction Co., which is building the great Government warehouses at South Schenectady, advises that in order to finish the work before winter an hour will be added to the working day. In future all laborers will work from 7 a. m. until noon and from 12:30 to 5:30 p. m. The work is going on rapidly. Ground has been broken for building No. 10, roadways are being laid out, and 5 mi. of water mains, with the necessary boilers and piping, are being installed. An 8-ft. wire fence will be built around the plant.

Martin Schenck, a widely known resident of Albany, and a former state engineer and surveyor of New York State, was taken suddenly ill on the street in Albany and passed away a few hours later at the Homeopathic Hospital in that city. Heart failure was the cause of death. As state engineer, Mr. Schenck had much to do with making possible the development of New York State's canal system, and he was one of those who advocated the deepening of the Hudson River to permit ocean vessels to dock in Albany and Troy. Throughout his life, Mr. Schenck's best efforts were directed toward the development of his state, especially the capitol district.

MOTOR VEHICLE TRANSPORTATION

Organization of Highways Transport Committee

War-Time Traffic Problems Necessitate Regional Division of Work

The Highways Transport Committee of the Council of National Defense has authorized the following statement relative to the organization of the committee to handle the problems of war-time transportation over the nation's highway:

The eleven regional chairmen of the Highways Transport Committee, Council of National Defense, who, following their recent appointment, attended a three-day conference in Washington, have returned to their districts prepared to



MAP SHOWING THE ELEVEN HIGHWAY TRANSPORT REGIONS.

take up in an intensive way their new duties. At this conference these regional chairmen were thoroughly grounded as to the war-time importance of their new work and as to the plans and activities of the Highways Transport Committee.

This formal action signalizes the transition of the problem of highways transportation from ancient to modern standards. The war has emphasized the fact that modern highway transportation problems demand modern treatment, hence the extension of the program of the Highways Transport Committee, Council of National Defense.

The war has taught the nation that problems affecting its interests must be looked at from the wider viewpoint, just as the one question of highway transportation suggests streams of commodities following natural lines of distribution, usually from one state to another.

An assignment of needed materials for a shipbuilding plant at Wilmington, Del., originating in New York City, may, for instance, call for passage through the states of New York, New Jersey, Pennsylvania and Delaware, thus in three different instances taking on an interstate character.

With highways transportation inalienably linked up with the question of commerce, and with commerce today knowing no boundaries, the work of the Highways Transport Committee, taking in the mutual interests of groups of states rather than of one state, or of one locality alone, has therefore been established along regional lines.

Further, expedition in shipment, which the Highways Transport Committee is daily emphasizing in its assistance to the Railroad Administration by diverting short hauls from rail lines to the highways, is becoming more and more vital.

The eleven highways transport regions into which the United States has been divided are indicated in the accompanying map. The chairmen appointed to supervise the work in the several districts are as follows:

Region No. 1, J. Randolph Coolidge, Jr., Boston, Mass.; Region No. 2, George H. Pride, New York, N. Y.; Region No. 3, C. A. Musselman, Philadelphia, Pa.; Region No. 4, W. Tom Winn, Atlanta, Ga.; Region No. 5, Harry L. Gordon, Cincinnati, Ohio; Region No. 6, John T. Stockton, Chicago, Ill.; Region No. 7, Earle Brown, Minneapolis, Minn.; Region No. 8, J. F. Witt, Dallas, Texas; Region No. 10, Julius L. Meier, Portland, Ore.; Region No. 11, L. A. Nares, Fresno, Cal.

New Model White Truck

Company Announces Changes in Drive, Power Plant, Cooling System and Brakes

New models of 3-ton and 5-ton trucks embodying an improved driving mechanism and other modifications of previous designs have recently been announced by the White Company of Cleveland, Ohio, manufacturer of the White truck.

The chief innovation is the substitution of a shaft drive for the chain drive heretofore employed. Several years ago the company stated that it would continue to use the chain drive for its heavy duty machines until a better form was devised. In announcing the change now made the company says, in part:

"The chain and sprocket afforded in a heavy duty truck a double reduction system—one reduction in a jackshaft and a second reduction in the chain and sprocket wheels—thus giving a large range of gear ratios and, consequently, a greater flexibility than can be had in any single reduction shaft drive unless the gear housing is made very large and the rear axle, in consequence, heavy and unwieldy. Chain



THE NEW WHITE MOTOR TRUCK.

drive also has this advantage: Power is applied to the rear wheels on a sprocket attached to them; power is thus applied nearer to the wheel rim and by a rolling contact between the chain and sprocket.

"The new double reduction gear drive accomplishes the same result. There is a first reduction through the bevel gear drive pinion in the center of the rear axle, from which the power is carried by a live axle of the floating type through the center of the housing to a gear at the wheel end of the live axle. This gear, in turn, meshes with a second gear (carried on the housing of the live axle, but inside the hub case of the rear wheel) and this second gear, in turn, meshes with a ring gear attached to the wheel inside of the hub case.

"In this way of applying power to the wheel, a second reduction occurs between these three gears in the hub case very similar to the reduction which takes place between the sprocket wheels of a chain drive. The power is applied at

about the same distance from the rim as it is in the case of the chain drive, thereby retaining that advantage. This use of gears makes a rolling contact throughout, without any elements to produce friction."

The engine improvement in the new models consists of the use of a unit power plant developed from the one formerly used. Among the advantages claimed for it are fewer parts, compactness, reduced weight, a greater valve capacity and an improved lubrication system.

Besides the improvements in the power plant and the driving mechanism, advantageous changes have been made in the cooling system and in the design of the brakes.

Packard Factory on 100% War Basis

The Packard Motor Car Company, of Detroit, Mich., states that the entire resources of its plant have been converted to war work and the company is now engaged exclusively in the manufacture of motor trucks, airplane engines, airplanes and war tractors.

The company will continue to deliver trucks to essential industries, in close cooperation with the War Industries Board and the Highways Transport Committee. All of the other new products of the company will be taken by the Government for military use.

It is announced that the adoption of this program will in no way affect the Packard service for the trucks and passenger cars now in use. Service stations will be supplied with necessary parts as heretofore.

Record Motor Truck Drive-Away

Fleet of 90 Machines Make 981-mi. Run in 17 Days

What is described as the largest truck train movement undertaken by the Government was recently completed when 90 3-ton Packard trucks reached Camp Jesup, Georgia, after a 981-mi. cross country run from the factory at Detroit.

The trip was unusual, not only on account of the number of machines and the distance traveled, but also because many of the roads traversed were unsuited to such heavy traffic and the crews had to construct and rebuild dozens of bridges along the route. The trip was made in 17 days and every truck is reported to have finished in fighting trim.

The train was in charge of Capt. G. P. Hippee, 1st Lieut., L. A. Couch and 1st Lieut. C. O. Middlebrook. Capt. R. F. Andrews accompanied the train as a special convoy officer. The trucks were manned by 200 soldier-mechanics from mechanical unit No. 305.

MEETINGS

Calendar of Coming Meetings

Nov. 14-15—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

OBITUARIES

James Murray Africa, City Engineer of Huntingdon, Pa., died at his home in that city on Sept. 18.

S. W. McCleary, a road contractor of Lodi, Cal., died recently. Mr. McCleary was 53 years old.

William S. Edwards, City Engineer of Portland, Me., died on Sept. 26. Mr. Edwards was 88 years old, and had been city engineer of Portland for about 35 years.

PERSONAL MENTION

L. O. Martin has resigned as bridge engineer of the New Mexico State Highway Commission and has entered war work.

H. S. Dartt has resigned as city engineer of Owatonna, Minn., to become city engineer of Mankato, Minn., succeeding H. F. Blomquist, resigned.

H. F. Blomquist has resigned as city engineer of Mankato, Minn., to become principal assistant engineer in the Bureau of Water Supply of St. Paul.

S. A. Siverts, Jr., for the past four years city manager of Morris, Minn., has been commissioned a first lieutenant in the Engineer Officers' Reserve Corps.

Franke J. Radigan has been appointed assistant county engineer of Hudson County, New Jersey. Mr. Radigan was formerly an assistant engineer in the Engineering Department of Jersey City, N. J.

J. J. Collins has resigned as assistant engineer in the Highway Department of the City of Baltimore, Md., and has become an assistant engineer on sewerage and other underground work at Camp Meade.

A. D. Whipple has resigned as chief engineer of the structural bureau of the Portland Cement Association to become chief engineer of the Lime Association. Mr. Whipple's headquarters are at Washington, D. C.

S. S. Steinberg, of the South Carolina State Highway Department, and formerly an assistant engineer in the New York State Highway Department, has been appointed assistant professor of civil engineering at the Maryland State College.

A. O. Peabody has been appointed bridge engineer of the New Mexico State Highway Commission to succeed L. O. Martin, resigned. Mr. Peabody, who was formerly with the Acheson Graphite Co., Niagara Falls, N. Y., has been in charge of construction and maintenance for the New Mexico commission.

Gen. George W. Goethals, Assistant Chief of the General Staff, U. S. Army, and Director of the Division of Purchase, Storage and Traffic, has been made a member of the War Industries Board. He takes the place of his recent assistant, Brig. Gen. Hugh A. Johnson, who has been assigned to active service.

Philip P. Farley has been appointed consulting engineer of the Borough of Brooklyn, N. Y. City. Mr. Farley was formerly president of the Jamaica Bay Improvement Commission and consulting engineer of the New York State Highway Department. For the past three years he has been engaged in private practice.

L. H. Wright, who was chairman of the Indiana State Highway Commission, has been appointed special representative of the Indiana State Council of Defense in the handling of matters pertaining to highway transportation. The State Highway Commission, as has been noted in these columns, went out of existence when the law creating it was declared unconstitutional by the courts of the state.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
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NEW YORK, OCTOBER 26, 1918

Number
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Highway Work in the Philippines

Summary of the Operations of the Bureau of Public Works in 1917 and Notes on Road Conditions and Traffic

During the fiscal year ending Dec. 31, 1917, the total expenditures for road and bridge work under the supervision of the Philippine Bureau of Public Works amounted to \$3,074,106.77. All of this except \$35,478.66, which was appropriated from insular funds, came from provincial and municipal appropriations, according to a detailed report on the operations of the bureau presented in the "Quarterly Bulletin."

At the end of 1917 there were 5,697 mi. of road in the islands. This mileage was divided as follows: First-class road, 2,318 mi.; second-class road, 1,275 mi.; third-class road, 2,104 mi.

First-class roads, according to the standards of the bureau, are "well graded and surfaced, thoroughly drained and constantly maintained." As a rule, the necessary bridges and culverts have been built and are of a permanent character, and where they are missing there are ferries capable of carrying automobiles. Roads of this class are passable at all times, except, possibly, at typhoon periods.

Second-class roads are "fairly graded, partially or naturally surfaced, and generally intermittently maintained. Bridges and culverts are usually complete, but, in part, are

temporary structures." These roads are described as passable for vehicular traffic during the dry season, but more or less impassable during the rainy season.

Third-class roads are the cart traffic routes that are not included in the first and second classes. They are usually narrow, poorly graded or ungraded, and generally impassable during the rainy season.

New work done in 1917 included the construction of 185.4 mi. of first-class road and 6.7 mi. of second-class road. In the same period the mileage of third-class road was reduced by 29.2 mi., making a net increase of 162.9 mi. in existing road.

The maintenance of roads cost considerably more per unit of length in 1917 than in 1916. During 1916, about 1,736 mi. of road were maintained by the gang system, while in 1917, the mileage maintained was about 1,895. Under the "caminero" system, which corresponds to the patrol system in this country, the mileages maintained in 1916 and in 1917 were 2,001 and 2,242, respectively. Caminero maintenance cost about \$410 per mi. in 1916 and about \$478 per mi. in 1917. In 1916 gang maintenance cost about \$136 per mi., while in 1917 it cost about \$148 per mi. The increase in 1917,



SAN JUAN—MARIQUINA ROAD, RIZAL, PHILIPPINE ISLANDS—BEFORE IMPROVEMENT.



SAN JUAN—MARIQUINA ROAD—ROADBED READY FOR FINISHING TOUCHES.



PHILIPPINE ROAD PATROLMEN—"CAMINEROS"—AT
SAN FERNANDO, PAMPANGA.

according to the report, was attributable "partially to increased labor and material costs, but largely to the destructive effect on highways of heavy motor traffic and the rapidly increasing number of motor vehicles."

The number of motor vehicles registered during 1917 was 6,024, of which 1,295 were registered for the first time. The vehicles previously registered and withdrawn from service numbered 963. The total registration included 1,158 motorcycles and other motor-driven vehicles having less than four wheelers. The fees for motor vehicles are as follows: Trucks with metal tires, \$25 for the first ton (metric, 1,000 kg. or 2,204.62 lb.) capacity and \$2 for each additional 500 kg.; rubber-tired passenger trucks, \$5 and \$1; rubber-tired freight trucks, \$12.50 and \$1.50; other 4-wheeled motor vehicles operated for hire, \$10 plus 10 ct. per horsepower; motorcycles, 2-wheeled or 4-wheeled, \$1.50; all other motor vehicles, 10 ct. per horsepower.

The total funds collected from motor vehicle taxation for the year amounted to \$31,001.45. Of this total, the sum of \$20,000 was used for the maintenance of first-class roads and \$9,224.15 was spent for salaries, wages and other outlays incident to enforcing the law, leaving a balance of \$1,777.30.

In discussing the growth and effect of motor vehicle traffic, the report states:

"Attention is again invited to the urgent necessity for amending the present automobile law as it relates to motor trucks. It is important that the use of steel tires for both

motor trucks and their trailers be prohibited. Of equal importance is the limitation of the gross load for all motor vehicles, not to exceed 4 metric tons. The inferior grade of surfacing material and the yielding subsoil of the Philippines make legislation along these lines imperative, as the economic condition of the country does not warrant the greater expenditure for more substantially constructed highways.

"In view of the fact that motor vehicles traveling at a speed common for such vehicles do exceptional damage to water-bound macadam surfaces, it is recommended that they be taxed in a measure to offset the extraordinary wear on road surfaces, as compared with other vehicles. The present tax of 10 ct. per horsepower should be increased to not less than 50 ct., preferably \$1, that the rate of taxation may be in keeping with that of other countries."

Louisiana Road Building Halted

Considerable Work Affected by Action of Government
in Commandeering Gravel Supplies

The taking over by the Government of all gravel plants at Anchorage and Roseland, La., will put a stop to 100 mi. of road construction now under way, according to recent advices from Louisiana.

The work affected includes about 32 mi. of road in St. John's Parish, 27 mi. in Ascension Parish, 3 mi. in E. Baton Rouge Parish and 32 mi. in Pointe Coupee Parish. These roads, according to State Highway Engineer Duncan Buie, are highways that are important links in the highway system connecting New Orleans with Baton Rouge and Shreveport.

Government Road Work in Virginia

About \$2,000,000 to be Expended for Work on Roads
Connecting Military and Naval Works and Camps

About \$2,000,000 is to be expended by the United States Government for road work in Virginia, according to recent advices.

The work is to be done on roads connecting the sites of military and naval operations carried on by the Government. It is expected that a part of the funds will be used for road work in the City of Norfolk and that other work will be done in and around that city and Portsmouth; between the cities of Old Point Comfort, Hampton and Newport News; between Camp Morrison and Camp Eustis, and also between Camp Eustis and Yorktown.

To Cut Road Machinery Output

War Industries Board Announces Restrictions on the
Manufacture of Machinery for Road Building

Additional curtailment of manufactures recently announced by the Priorities Division of the War Industries Board includes restrictions on the making of road building machinery. The order, which is made to "conserve material, labor, fuel, transportation and capital in general industry for the purpose of supplying the supreme war demands," is as follows:

"Six months from October 1 no road making machinery shall be manufactured except: (1) Repair parts; (2) for work on railroads and other public utilities; (3) for roads repaired by the United States Government, the several states, counties and municipalities; (4) for new construction by the United States Government, either directly or indirectly."



TYPICAL PHILIPPINE TRAFFIC—GOAT TEAM ON THE
LEGASPI-TABACO ROAD.

Organization for Road Maintenance*

Discussion of the Administration and Operation of Maintenance Work in Michigan with Especial Reference to the Patrol System in the Township

By L. H. NEILSEN †

The development of road improvement has each year been bringing home to all of us the necessity for closer attention to road maintenance. As the length of time a road has been improved increases the need for closer attention to its upkeep becomes more and more apparent. The longer a community has been engaged in road improvement, the greater the extent of its connected mileage. As soon as any considerable portion of a certain road has been improved, traffic begins to flow toward it from all directions. It is not an uncommon thing to hear an automobilist or farmer say:

"Yes, it is a little further but it is a state rewarded road and we will save time and trouble by going a little out of the way."

The result is that many miles of road were improved to a certain standard that has later proved inadequate to carry the traffic imposed upon them. In more instances, the improvement would have been adequate if proper maintenance had been provided for. The early construction was almost entirely B-9, i.e., a gravel metal track 9 ft. in width. In a number of localities roads can be pointed out which have been intensively maintained with the result that it is quite difficult to say just where the old road ends and new road of the B-16 type built according to the recent trunk line specifications begins.

The fact that for a considerable time the stretches of continuous road were short, made the maintenance problem a difficult one. That trouble is, for the most part, disappearing rapidly.

Since the greater portion of improved road mileage has a gravel surface, the maintenance of that class of roads is first in importance. To be successful, it must be strictly continuous. For that reason the patrol system must necessarily be preferred to the gang system for gravel roads. This is because, having a one-man system, the local community can afford to let him cover his section more frequently than would be possible if a gang were employed to do the same work. Following the same line of reasoning, the less expensive the patrol unit is, the shorter the section can be made and the more continuous the maintenance.

For maintaining roads by the patrol system, several methods can be employed:

(a) A man, equipped with a wheelbarrow and such small tools as may be required, is given a section of road to keep in shape. He is directly responsible to the maintenance superintendent of the local unit for the condition of his section. Gravel is placed in small piles at short intervals along the side of the road. He patches holes and ruts in the metal; takes out the surface and removes from the road all over-size stone; keeps the shoulders in repair; cuts all weeds and brush on the right of way; keeps ditches, culverts and ditch outlets in good working order, and generally does such hand labor as is necessary to keep his section of the road in first-class condition. He is given authority to hire extra help when necessary to do the floating, replenish stock piles, mow the grass on the shoulders and make unusual repairs. In some cases where the traffic is so heavy that daily floating is required, men with teams or tractors are engaged to float continuously. The regular

county gangs replenish stock piles and spread gravel directly on the road when larger amounts are required.

(b) Sometimes the patrolman is equipped with a horse and light wagon, usually furnished by him, and a light road float which, together with the small tools, is furnished by the county. If this is done, the stock piles can be placed further apart and, in exceptional cases, maintenance material may be hauled direct from the pit. He can do his own floating also.

(c) Again, the patrolman uses a team and wagon of his own and a road float and small tools supplied by the county. In such cases he very often hauls his own maintenance materials from the pit and nearly always does his own floating.

In any of the cases outlined, it is necessary to provide for going over the roads twice a year, spring and fall, at least, with a heavy four-wheeled grader preferably drawn by mechanical power. This is to restore the crown, take out waves and to cut off sod shoulders which may have become too high. A gang should also go over the shoulders and ditches once a year to restore them to original line and cross section.

Whenever any considerable mileage is involved, it is essential that there should be a superintendent to keep each patrolman supplied with equipment and materials, and control the work. In a county under the county road system, one man must have responsible charge of all maintenance work if the best results are to be had. It may be the county superintendent, county engineer or someone appointed by him.

For water-bound macadam maintenance, the one-horse patrol has been found satisfactory. Where the roads were originally constructed of limestone, a surface treatment of bituminous material is usually applied. For the maintenance of such a surface, a light truck with one man in addition to the driver makes a satisfactory unit.

On crushed cobblestone macadam the use of a lean gravel for covering has often been successful. This can be floated and maintained generally by the same methods that are used for a gravel surfaced road.

For pavement types of roads, the equipment required usually makes it necessary to have a larger gang.

A great many townships are getting a sufficient mileage of improved roads to justify the employment of one or more patrolmen.

The great difficulty in township road work is to get the work done at the proper time. Where a man has been given a short stretch to look after it usually turns out that just when he ought to be floating or patching the road, he is too busy with his farm work to do it. For this he cannot be blamed, as the products of the farm are certainly needed, particularly at this time. But the roads must also be maintained, so that these same products can be transported to market. The roads cannot be allowed to deteriorate, as that would mean the loss of the capital invested in them. In order to insure that the necessary work be done economically and at a time when it will do the most good, each township should hire at least one man to spend his whole time on the roads, both state reward and unimproved earth roads. If the funds available permit, two or more men and teams should be hired by the month. The highway commissioner will then have someone to send anywhere in the township at any time that work should be done.

* Paper presented at the tenth annual convention of the Michigan State Good Roads Association, Detroit, Mich., Sept. 3-5, 1918.

† Maintenance Engineer, Michigan State Highway Department.

Such improvement funds as are available from year to year can be expended in grading and turnpiking roads to a surveyed grade, in providing proper road ditches with the necessary outlets, and in building adequate, substantial bridges and culverts. Once this has been done, a great many miles of township roads may be maintained in proper condition for such traffic as they may be called on to carry without placing a surface of material other than the natural earth. The expense of floating them frequently enough to keep the surface smooth and free from holes and ruts will be small compared with the expense of surfacing even with gravel. If at a later date the traffic increase be such that a gravel or other surface is necessary, the grade would be comparatively easy to fit up to receive it. In this way, such work as is done on the earth road is not wasted.

Other states, notably Iowa, have taken far-reaching steps

to provide for the improvement of earth roads at a comparatively small expenditure. After grading and turnpiking have been taken care of, the roads are handled under the patrol system until such time as traffic requirements may demand a more durable surfacing material.

A change in township organization for doing road work would result in saving large amounts of money. Under the present arrangement a township commissioner does not have an opportunity to do justice to himself or the township. Changes in the constitution and highway laws should be made to provide for making him an appointive officer to be selected by the township board and to hold office during satisfactory performance of his duties. He should be paid an adequate wage for his work and then could feel that his stay in office would depend more nearly on the showing he might make.

The Prevention of Longitudinal Cracks in Hard-Surfaced Pavements*

Description of a Patented Method of Constructing Foundations for Brick, Concrete and Other Surfacing

By Wm. C. PERKINS†

Can longitudinal cracks in hard-surfaced pavements be prevented? Many brick and concrete pavements, especially in northern latitudes, develop unsightly cracks along the center line of the pavement, which mar otherwise good pavements. These cracks may not lessen the durability of the pavement, and they are easily taken care of at small expense; but they are defects which we should endeavor to overcome by improved constructional methods.

The study of longitudinal cracks in hard-surfaced pavements has evolved several theories of causes. The generally accepted theory is that of pressure exerted against the under side of the artificial foundation by the freezing of water in the underlying subgrade. Undoubtedly other conditions, such as traffic or soft subgrade, might be either an efficient or a contributory cause of cracking; but in my opinion 90% of longitudinal cracks are the result of frost heavage.

How can this frost action be prevented? We have said in the past, "Drain! drain! drain! and more drain! Keep the subgrade dry"; and in our endeavors to keep subgrades thoroughly dry we have cross-drained, drained longitudinally, herringbone drained and drained the taxpayers' pockets, yet we have longitudinal cracks, many times directly over our elaborate system of drainage.

Underdrainage is unquestionably advantageous in lowering the water table, but present methods fail to keep subgrades dry, particularly in clay soils and in soils susceptible to capillarity. While our present drainage system does not prevent cracks due to frost action, it does tend to prolong the life of pavements. Nevertheless, in spite of drains a certain amount of water reaches the subgrade underlying and supporting the artificial foundation, and successive freezing and thawing, especially in the early spring of the year, causes upheaval of the subgrade. As explained in a recent article printed in certain engineering journals, as the pressure cannot go downward on account of the frozen

ground, it must extend upward. This upward thrust breaks the pavement.

We do not know exactly how the pressure acts; we have not enough data on the subject to warrant positive conclusions. Undoubtedly, after the war, when engineers will have more time for research work, tests will be made to determine exactly how the upward pressure acts and how the resultant forces are distributed through the pavement. All we really know now is the result—a pavement cracked, usually along or near the center.

Evidently the remedy must be found in a foundation design. Can we construct a foundation which will, either directly or in some measure, overcome the destructive action of frost?

As a means of accomplishing this purpose I suggest a foundation constructed as follows:

Upon the earth, or prepared subgrade, lay a course of two-duct tile 4-in. in height, outside measurement. The surface measurements could be any standard size, but I would suggest 8½ in. wide by 12 in. long. They may be made of any desired material, such as concrete, vitrified shale or clay, and of any shape or form.

Complete this foundation with 2 or 4 in. of concrete or other suitable material. We have then prepared a 6 to 8-in. foundation upon which to place our wearing surface of any standard paving material—brick, block, concrete or bituminous.

By the use of the tile in the artificial foundation, we endeavor to minimize the force of the upward pressure of a frozen subgrade.

(1) The tile acts as a non-conductor of heat between the ground and the paving; the air within the ducts of the tile serving as a non-conductor prevents the extreme cold or frost from penetrating through the pavement of the subgrade, and also prevents the escape of heat from the earth. In many sections this type of construction may prevent actual freezing of the subgrade, while in extreme northern sections it will materially reduce the freezing.

(Concluded on page 161.)

*Paper presented at the 24th annual convention of the American Society of Municipal Improvements, Buffalo, N. Y., Oct. 2-4, 1918.

†Chief Engineer, Dunn Wire-Cut Lug Brick Co., Conneaut, Ohio.

GOOD ROADS

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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CURTAILING THE ROAD MACHINERY OUTPUT

Road builders will note with somewhat mixed feelings the order of the War Industries Board curtailing the manufacture of road machinery, which is noted on another page.

The reason for it, as set forth in the formal announcement, "to conserve material, labor, fuel, transportation and capital in general industry for the purpose of supplying the supreme war demands," are quite sufficient—in themselves. But we surmise that more than a few road builders will question—to themselves, at least—whether these reasons apply in this particular case. While there will be no attempt to disregard the order or to circumvent it, there may be doubt as to its wisdom.

"Good Roads" is for every measure that will hasten the war to a victorious conclusion; its readers are outdone by no one in their loyalty. But both "Good Roads" and its readers have an unshakable belief in the value of improved highways in war time as in peace time—in the necessity for maintaining at its highest efficiency the nation's highway system. Though roads alone can not win the war, they can make possible the winning of the war by the mobilization of the nation's resources at home for the support of the nation's armies abroad.

The war is not yet won, but America and the Allies are winning. It is now time to press the advantage, to apply "force without stint" and to marshal every resource for "supplying the supreme war demands."

But can this be done if the United States neglects its roads? There is no reason to suppose that it can. In fact, there is every reason to believe that it cannot. Great Britain neglected her roads in the early years of the war—and was obliged to reverse her policy. France has taken most excellent care of her roads from the first; had she not the tide of battle would not now be setting towards Berlin.

The construction, maintenance and repair of roads require labor. At present labor is hard to obtain, and it will be increasingly difficult to secure as war needs make larger demands upon the country's man power. To a very considerable degree, machinery can be made to take the place of labor, and for that reason war-time road work calls for a

greater use of equipment than does similar work in normal times.

It may be that the order will not adversely affect road work, for the exceptions made cover practically all operations allowed by the restrictive rules and regulations with which highway work is hedged about. This immediately suggests inquiry as to the necessity for specific curtailment of something that has already been curtailed in another way. In other words, if no road work except that specifically covered in the exceptions noted may be carried on, why should it be necessary to prohibit the manufacture of machinery to be used on other work? Why forbid manufacturers to supply a market that presumably does not exist?

The whole theory of government in war time, as we understand it, is to subordinate private advantage to the general good—the general good being the winning of the war in the least possible time and at the minimum cost in men and materials. It follows that in applying this theory private enterprises must suffer. But road building, when carried on properly, is not a private enterprise; it is public work for the benefit of the people at large. For reasons that have been stated many times in these columns, it differs from many kinds of public work in that it is not only necessary but vital in war time as in peace.

A NOVEL FOUNDATION FOR HARD-SURFACED PAVEMENTS

A novel method of preventing longitudinal cracks in hard-surfaced pavements was suggested by Wm. C. Perkins, Chief Engineer of the Dunn Wire Cut Lug Brick Co., at the recent convention of the American Society of Municipal Improvements. The paper in which the suggestion was made is printed elsewhere in this issue.

Briefly described, the plan is to lay a sub-foundation of 4-in. concrete, shale or clay, 2-duct tile which would carry a concrete foundation of the usual type but of less than usual thickness. Mr. Perkins suggests that it be from 2 to 4 in. On this the wearing surface would be laid in the usual manner.

Prevention of cracks, according to Mr. Perkins, would be achieved through the taking up of strain by the tile and through its action as an underdrain. He argues that tile and concrete together would be as strong as concrete of equal thickness and that even were the bottoms of the tiles broken, the side and partition walls would carry the load. He is also of the opinion that the cost of the proposed construction would be no greater than that of a foundation made entirely of concrete or other material of equal load carrying capacity.

It is understood that the construction has not been subjected to a service test. Such test will doubtless be made, however, and if it is it will be watched with interest.

STREET CLEANING OF THE FUTURE

A suggestion that may well be given serious consideration was made by the street cleaning committee of the American Society of Municipal Improvements at the recent convention of that organization.

In the committee's report, which is printed on another page of this issue, it is pointed out that by directing attention to the waste of various materials by the American people the war has had a marked effect upon the collection and disposal of rubbish and garbage. This matter of waste has been impressed so strongly upon the general public that, according to the committee, "individual economy in saving paper, rags, and metals, and especially in squeezing the plethoric American garbage can, has most materially affected" the various disposal plants in operation. These new habits of saving, it is pointed out, may render of little comparative

value studies made of such plants under present conditions, "unless we assume that the American public has learned lessons of economy which may be enduring." But in the next, and concluding, paragraph it is pointed out that: "No one can predict how far our lesson of economy under trying war conditions may be remembered or practiced under a return to what we may hope will be a condition of happy prosperity."

The exact extent to which habits formed under the stress

of war times will persist when peace is restored can not be foreseen, even by the shrewdest observer. Of course, this war is not going to work any basic change in human nature. On the other hand, it has taught valuable lessons of true economy, and some of the practices forced upon people by war conditions will survive as fixed habits. Thrift and economy are among these, and they will probably have to be taken into consideration in the future in planning for street cleaning and other highway work.

A Report on Street Cleaning*

Text of Report Submitted to the American Society of Municipal Improvements by
Its Committee on Street Cleaning

Your committee has had in mind that while many members of this society are interested in street cleaning this field has, within the past two or three years, been so broadened as to warrant the formation of a society especially devoted to this one subject and that it is also covered by the enlargement, along engineering lines, of the American Public Health Association with its committee on this subject. With these other associated activities now in operation we have felt that the work of this society, being so broad and general in scope, we might reasonably subordinate this feature this year, devoting more of the limited time to subjects not so well covered by the activities of other organizations.

However, we would now call attention to some general phases of the subject which are of present interest.

From the economic or theoretical engineering side we should know whether we are cleaning streets for public convenience, for aesthetic reasons or for protection of the public health; or otherwise for what definite purposes these expenditures are made.

Undoubtedly the primary reason for street cleaning is for the promotion of public comfort or convenience. The annoyance of dust to the users of the highway and to those adjacent, as well as damage to property, may well be considered primary, especially if coupled with its wet condition as mud.

The second consideration, the aesthetic, may well have its weight, especially in elimination of rubbish, waste paper and larger debris which so offend our sense of propriety, but have little bearing on either health or comfort.

The third consideration, that of health, may be one which should warrant extensive and expensive work in this line. The Street Cleaning Committee of the American Public Health Association, Samuel Whinery, Chairman, in its report of about two years ago, after diligent inquiries and collection of practical evidence, strongly inclined to the opinion that, while theoretically there might be much danger from unclean streets, from the health viewpoint, there was little or no positive evidence of such. This opinion was largely based on lack of definite information that those engaged continuously in street cleaning and similar work suffered any ill effects from what might be considered as abnormal or excessive exposure to those conditions supposedly deleterious to health from street dust and similar influences. At least one member of your committee, from experience with local spring and fall epidemics of influenza and bronchial affections when street cleaning in northern cities is interrupted, is firmly of the opinion that the consideration of health may be well ranked as the most important factor

in determining the extent of such work. Lacking, as yet, any definite conclusive evidence, it may now be assumed that cleaning, such as to remove fine dust and mud which may cause such, offers a reasonable task in street cleaning for comfort and health. The aesthetic considerations in removal of unsightly litter, unless the same be considered a source of dust by pulverization, may be given consideration to the extent which the locality may warrant in expenses.

The change from dry to wet methods of cleaning, now so increasingly evident, has a material bearing on the above considerations.

From the practical or operative end of street cleaning, two phases stand out prominently as modifying practice; the substitution of motor vehicles for animal power and of flushing for dry sweeping.

The use of motor vehicles both for actual cleaning and for collection and hauling of municipal waste is but a phase of the general and increasing use of such vehicles, and must largely be a local question of economics, dependent in desirability of change from horse-drawn vehicles, upon loss of investment in existing equipment, length of haul, available funds and other local conditions. Apparently all plans for future development should contemplate the large ultimate use of motor vehicles.

The same change to serviceable motor vehicles has largely increased the practicability of flushing in cleaning. There were certain limitations to obtaining and maintaining adequate flushing pressure in horse-drawn vehicles.

In many cities the functions of street cleaning and sewer cleaning or sewage disposal are under somewhat separate supervision, and where such is the case there may well be required closer joint study of the problem as a whole for ultimate economy. Where no systematic gutter cleaning follows flushing, either the heavy street detritus is left in the gutters or is flushed into catch basins, and much of it ultimately into the sewers. We may, therefore, well bear in mind that this successful cleaning method may demand some modification in catch basin practice for protection of sewers.

In combined sewerage systems we may reasonably expect some added expense in sewer cleaning, but where ultimate sewage treatment is given or required, as it soon will be in many cities, the question of the effect of the added burden on the detritus tanks or on the general operation of the whole plant must be given close study.

One engineer of a large city says: "Cities having sewage disposal works find that the detritus from the streets somewhat complicates the question of sewage disposal. All of it cannot be handled in detritus chambers, except at very great cost." While such cost may be a material added

* Presented at the 24th annual convention of the American Society of Municipal Improvements, Buffalo, N. Y., Oct. 2-4, 1918, by Geo. H. Norton, Rudolph Hering and R. C. Harris.

burden to sewage treatment it is equally true that the cost of gutter sweeping or the dry removal of street dirt is a very large expense in dry street cleaning, and the engineering determination of an absolute combined minimum in expense presents one of those nice problems which we must solve. The solution is only possible through the collection of complete data and careful analysis. This would seem to offer an early and fertile field for study.

One other phase of street cleaning is of especial interest to the northern cities—that of snow removal, in connection with use of motor vehicles.

In case of heavy snow falls, usually the first streets opened to traffic are those containing surface car tracks, and the northern cities are mostly equipped to keep their tracks clear. The result is that motor vehicle traffic is at once diverted to these streets with resulting congestion and delay in traffic. The universal use of motor vehicles for all classes of traffic warrants the provision for its accommodation, and cities must be equipped and ready to keep thoroughfares open for this traffic while snow is falling and afterward to make viable streets.

Often the motor equipment provided for other phases of cleaning is most applicable and available for this work, and any consideration of motorizing in these northern cities should include the use and availability of such in solving the snow problem.

The collection, and especially the disposal, of rubbish and garbage has been materially affected by war conditions.

The demand for utmost economy in these trying times has made it evident to cities not fully utilizing these sources of saving that they are to an extent wasting; that much of the various materials which would be of service to the cause are being wasted. But this has been so thoroughly impressed on the public that the individual economy in saving paper, rags and metals, and especially in squeezing the plethoric American garbage can, has most materially affected the various plants in operation for these purposes. The general individual saving and sale of rags, waste paper, etc., and, more particularly, the very general elimination of grease content from garbage, make any studies of operation of these plants under present conditions of little comparative value unless we assume that the American public has learned lessons of economy which may be enduring.

More than a word of caution therefore should be given to those who may now study past and even present quantities and recoverable values in refuse that neither may safely be used for estimates of the future. No one can predict how far our lesson of economy under trying war conditions may be remembered or practiced under a return to what we may hope will be a condition of happy prosperity.

The Prevention of Longitudinal Cracks in Hard-Surfaced Pavements

(Concluded from page 158)

(2) When the earth, or subgrade, does freeze, notwithstanding the heat insulation of the tile, the force, or explosion, will be compensated by the air space and not be transmitted to the paving above. In case the tile be too strong to break under pressure of a frozen subgrade, the bottom of the tile, under the air spaces, could be "scored," thus providing a weak spot to break under this upward pressure. The superfoundation and the wearing surface would be sufficiently strong to bridge over any breakage of the bottom of the tile under the air-space sections, since the walls and partitions of the tile would remain intact and would afford ample support to the superfoundation.

(3) The tile would also act as drains to carry off any

ground water or water drawn into them by capillary action, thus lessening the hazard of cracking due to the upward force exerted by frost in the subgrade.

The tile may be laid longitudinally, transversely or diagonally. If laid either transversely or diagonally, the water would be carried to the curb or edge, where it could be taken care of by means of longitudinal drains or French drains of gravel or stone. If the tile were laid longitudinally the water could be taken care of at regular intervals by cross-drains of tile or by French drains of gravel or stone. The grade and cross-section of the improvement would determine these details.

It is difficult to estimate comparative prices in these abnormal times, but basing estimates on available data, the 4-in. tile should not cost more than 4 in. of concrete, in place, and if constructed as suggested, the tile and concrete foundation should be able to carry at least the same load as if the foundation were entirely of concrete or of a material of equal load bearing strength.

The type of foundation I have suggested as a means of preventing longitudinal cracking of hard-surfaced pavements is the result of study and experience, and while it has not been subjected to the final test of practical service under all kinds of climatic and traffic conditions, I have sufficient faith in its utility for the purpose designed to have the type of construction protected by patent.

Contracts for Army Motors

Awards Amount to about \$130,000,000 for Supplying the Recently Organized Motor Transport Corps

Contracts amounting to about \$130,000,000 have recently been placed for motor trucks, ambulances, chasses, trailers, tractors, passenger cars, motorcycles and bicycles for the equipment of the recently organized Motor Transport Corps.

Included in the items covered by the contracts are the following: 800 3½-ton trucks, 202 2-ton trucks, 500 1½-ton trucks, 600 5-ton chasses, 1,020 3½-ton chasses, 6,250 3-ton chasses, 2,100 2-ton chasses, 565 1½-ton chasses, 24,950 Class B chasses, 3,584 10-ton tractors, 13,500 4-wheel drives, 8,000 Ford cars, 1,000 Dodge cars, 300 Dodge winter cars, 558 limousines, 3,000 delivery cars, 18,775 motorcycles, and 25,000 bicycles.

Dixie Highway Link Completed

28-mi. Section Between Rockwood and the Ohio Line Formally Opened to Traffic

A 28-mi. section of the Dixie Highway, extending from Rockwood, Mich., southerly to the Ohio state line, has been formally opened to traffic.

The improvement of this section of the road was commenced in 1915, but on account of various obstacles it was not until this year that the bulk of the work was done. The section of road is on one of the routes used for the delivery of motor trucks from the factory to the Atlantic seaboard and during last winter was in such condition that motor truck trains were seriously delayed. This led the Michigan War Board to interest itself in the project and the work was put under direction of State Highway Commissioner Rogers who placed L. C. Smith, his former chief deputy, now engineer of Wayne County, in active charge of the construction. The improvement cost approximately \$600,000.

The ceremonies incident to the opening of the road were participated in by Mayor Arthur B. Marx of Detroit; C. C. Kilbury, Vice Mayor of Toledo, Ohio; State Highway Commissioner Rogers, Edward N. Hines, Chairman of the Board of County Road Commissioners of Wayne County and others. The first traffic over the road consisted of a train of 12 Army trucks.

Convicts to Work New Jersey Road

Plans Completed for the Utilization of State Prisoners on Important Section of the Lincoln Highway

The State Highway Engineer and the Commissioner of Charities and Corrections of New Jersey, have completed plans for the utilization of prisoners from the Rahway Reformatory in rebuilding a section of the Lincoln Highway in Metuchen. This section of road, officially designated as Section 1 of State Highway Route No. 1, is part of the main route between Trenton and Newark and is characterized as perhaps the most important piece of work now under way in the state.

Under the terms of the agreement made, prisoners will be employed under the supervision of the State Highway Department, which will pay to the State Board of Charities and Corrections 50 ct. per hour, less the cost of supervision and transportation, for each of the prisoners used. The men will be brought from the reformatory to the work in motor trucks and will be returned to the reformatory each night, remaining in the custody of the superintendent of the reformatory, as has been customary in all other cases where reformatory inmates have been employed on state road work.

Truck Routes at Chicago, Illinois

Trustees of Sanitary District Plan for the Construction of 55 mi. of Motor Truck Highways Along Drainage Canals

A system of about 55 mi. of motor truck highways along the main drainage canal at Chicago, and two of its branches, has been proposed by the Trustees of the Sanitary District.

The district now owns vacant land along three of the canals, which are ample to provide rights of way for heavy traffic roads. From Western Ave. in Chicago to Joliet, a distance of 30 mi., the district owns a right of way 28 ft. in width, on the south side of the channel. A similar strip, 250 ft. wide is owned along the Wilmette Channel, while along the Calumet-Sag Channel the district owns a strip of land nearly 1,000 ft. wide. In addition, the district owns a large amount of stone that has been blasted from the channels and is piled up along them. This stone is said to be good road material and could be crushed and transported along the channels in barges at low cost.

The following resolutions relative to the proposed undertaking have been passed by the trustees:

"WHEREAS, there will be submitted at the coming November election a proposal that the State of Illinois proceed to issue \$60,000,000 in bonds for the purpose of improving the roads and highways of the state outside of the County of Cook, and

"WHEREAS, after the close of the existing war the needs of the people of Cook County for good roads and avenues of approach to said county and the City of Chicago will be such that every effort should be made to accommodate the increased traffic over the highways and streets of said municipalities, and

"WHEREAS, the Sanitary District is now the owner of a right of way on both sides of its main channel between Western Ave. and Lockport, Ill., for a distance of about 30 mi., and is also the owner of a right of way along its north shore and the Calumet-Sag channels of about 8 and 10 mi. in length, respectively, which rights of way are so situated that roads could be built along certain portions thereof without seriously interfering with the corporate uses to which they might be put by the Sanitary District, and

"WHEREAS, the Board of Trustees feels that the establishment of such roads in the localities named would be of

material benefit to the taxpayers of the Sanitary District, as well as the inhabitants of the entire State of Illinois, now, therefore be it

"RESOLVED, that a committee consisting of Wallace G. Clark, James M. Dailey and George W. Paullin, be and the same hereby are appointed to take such steps as may be necessary to cooperate with other public agencies having charge of the construction of roads and boulevards, and if necessary to obtain the passage of an act of the General Assembly at its next session, which will grant to some public agency the power to construct such roads along said rights of way and also to call to its aid the departments of the Sanitary District to make a report upon the advisability and cost of constructing such roads."

Road Work in Union County, New Jersey, in 1919

Program Announced by County Engineer Includes no New Construction and a Material Cut in Maintenance Appropriations

The 1919 road program of Union County, New Jersey, has been prepared and forwarded to Washington for the approval of the United States Highways Council.

It is stated that for the first time in the history of the county the program calls for no new work. County funds for reconstruction amount to \$40,000 and for maintenance, \$125,000, making a total of \$165,000 as against a usual county expenditure of about \$250,000. According to County Engineer Bauer, the \$125,000 appropriated for maintenance will not be sufficient to keep the roads in proper condition.

In addition to the expenditures planned by the county, nearly half a million dollars will be expended if the Government approved the proposals that have been made by the towns. The sums which towns ask permission to expend amount to about \$84,000 for construction, about \$70,000 for reconstruction, and between \$250,000 and \$300,000 for maintenance.

Development of the Rural Motor Express

Data on the Work Done Included in Report to National Automobile Chamber of Commerce.

Data on the development of the rural motor express since its extension was undertaken are contained in the report submitted by S. A. Miles, of the Motor Truck Committee of the National Automobile Chamber of Commerce, to that body.

The formation of companies to operate routes has developed to such an extent that it has been impossible to keep in touch with them, and it is therefore impossible to give an accurate estimate of the business resulting, according to Mr. Miles.

The committee has cooperated with the Highways Transport Committee of the Council of National Defense and has succeeded in interesting not only a great many of the members of the chamber, but also a large number of dealers, agents, food administrators, highway departments, chambers of commerce and individuals.

It is reasonably certain, according to Mr. Miles, that the rural motor express has resulted in the sale of at least 500 trucks, and that unless the work is interfered with by Government restrictions the number will rapidly increase.

The standardization of rates is one of the difficult matters which the committee has met and it is still without sufficient data to warrant the making of arrangements for the entire country. It is cooperating, however, with the authorities of several states, particularly with the Public Utilities Commission of New York.

M E E T I N G S

Calendar of Coming Meetings

Nov. 19-21. Southern Appalachian Good Roads Association.—Annual meeting, Asheville, N. C. President, A. D. Williams, Morgantown, W. Va.

Nov. 21-22.—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Washington State Good Roads Association

The date of the annual convention of the Washington State Good Roads Association at Pasco has been changed from Nov. 14-15 to Nov. 21-22, as noted in the "Calendar of Coming Meetings" elsewhere on this page.

Governor Lister, of Washington, will have charge of the program on the first evening.

American Road Builders' Association

The annual "get-together" dinner of the American Road Builders' Association, will be held at the Automobile Club of America, 247 W. 54th St., New York, N. Y., at 6:30 p. m., Saturday, Nov. 2.

The result of the election of officers for the coming year will be announced, addresses will be made by the retiring president, the new president, and others; and various matters of business will be taken up. Among these are plans for the extension of the association's activities and arrangements for the 1919 convention.

This convention, it is announced, will be held in New York City in February. Plans are already being formulated, and it is the intention of the officials to make it one of the most notable in the history of the organization. The war has had far-reaching effects upon the work of road builders and the many problems they have had to meet during the past two seasons will form the principal topics of discussion at the convention and at the annual dinner. For this reason a large attendance at the convention is looked forward to by those in charge of the association's affairs.

New York State Highways Transport Committee

A meeting of the Highways Transport Committee of the New York State Council of Defense was held at Syracuse, N. Y., on Oct. 7.

Among the speakers were State Highway Commissioner Edwin Duffey, of New York; George C. Diehl, County Engineer of Erie County, and D. H. Lewis, Secretary of the Automobile Club of Buffalo.

The principal topic discussed at the meeting was the formation of plans for keeping the main routes clear of snow during the coming winter. It was said that it had been determined to spend \$20,000 of the \$50,000 appropriation made by the 1918 Legislature, for the construction of snow fences. The plans also include the extensive use of

motor trucks equipped with snow plows. Further arrangements include the division of the state into districts in charge of the county engineers, and the utilization of the equipment owned by the different towns.

Kentucky Highway Engineers' Association

The Kentucky Highway Engineers' Association, formerly the County Road Engineers' Association, will hold its annual convention at Owensboro, Ky., on Nov. 12, 13 and 14. A marked departure from the usual convention methods will be the delivery of most of the technical addresses out of doors on road jobs that will serve as illustrations of the points made by the speakers. The program follows:

Tuesday, November 12.

Opening Session, 9:00 a. m.

Opening Address, Herman Birkhead, County Attorney, Daviess County.

Welcome on behalf of Daviess County, C. W. Wells, County Judge, Daviess County.

Welcome on behalf of the City of Owensboro, John C. Calhoun, Mayor of Owensboro.

Response on behalf of the Association, Merritt Drane, County Road Engineer, Jefferson County.

"The Program," J. W. Spurrier, County Road Engineer, Daviess County.

Appointment of committees and other business.

Inspection of Daviess county machinery and equipment.

Afternoon Session, 1:00 p. m.

Inspection of record keeping in County Road Engineer's office.

Lecture by Herman W. Taylor, Assistant County Engineer, Daviess County.

"Macadam Maintenance," outdoor lecture and demonstration, R. C. Heath, Road Engineer, Kentucky Department of Public Roads.

"Ditching on Surfaced Roads," outdoor lecture and demonstration, W. H. Edwards, Jr., County Road Engineer, Woodford County.

Evening Session, 8:00 p. m.

"The Engineer in Road Work," Rodman Wiley, State Commissioner of Public Roads of Kentucky.

Speeches.

Entertainment.

Wednesday, November 13.

Morning Session, 9:00 a. m.

"Earth Road Maintenance and Ditching," outdoor lecture and demonstration, R. C. Giffin, County Road Engineer, Hopkins County.

"River Gravel Road Construction and Maintenance," outdoor lecture and demonstration, J. W. Spurrier, County Road Engineer, Daviess County.

Barbecue Dinner.

Afternoon Session, 1:00 p. m.

"Bank Gravel Road Maintenance and Construction," outdoor lecture and demonstration, W. V. Gregory, County Judge, Graves County.

"Bridge Painting," outdoor lecture and demonstration, C. D. Snead, Bridge Engineer, Kentucky Department of Public Roads.

"Rock Asphalt Surfacing," outdoor lecture, W. N. Bosler, Division Engineer, Kentucky Department of Public Roads.

Evening Session, 8:00 p. m.

Patriotic Address, A. O. Stanley, Governor of Kentucky.

Thursday, November 14.

Morning Session, 9:00 a. m.

"Culvert Headwall Construction," outdoor lecture and demonstration, J. S. Boggs, Division Engineer, Kentucky Department of Public Roads.

"Reinforced Concrete Bridge Construction," outdoor lecture and demonstration, C. D. Snead, Bridge Engineer, Kentucky Department of Public Roads.

Afternoon Session, 1:00 p. m.

"Road Surveying," Hugh Crozer, Division Engineer, Kentucky Department of Public Roads.

Business Session.

Reports of Committees.

Election of Officers.

Adjournment.

National Truck Owners' Conference

The sixth National Truck Owners' Conference was held at the Lafayette Hotel, Buffalo, N. Y., on Thursday, Oct. 10.

George C. Diehl, County Engineer of Erie County, was one of the principal speakers at the afternoon session, his topic being "Good Roads and How They Save Money for Shipper and Consumer." George H. Pride, a member of the Highways Transport Committee of the Council of National Defense, and regional chairman of that committee for the district including New York and Connecticut, was scheduled to speak on "Mobilizing America's Industrial Transport," but was unable to be present.

Most of the attention of the meeting was given to addresses and discussions on truck operation.

At a meeting of the Metropolitan Section of the Society of Automobile Engineers held at the Automobile Club of America, New York, N. Y., on October 16, the principal speakers were George H. Pride, of the Highways Transport Committee; Hugh Gibson, of the "New York Herald," who was in charge of the fuel test tour conducted by that paper; N. B. Pope, Editor of "Automobile Topics," and C. F. Clarkson, General Manager of the S. A. E.

PERSONAL MENTION

Albert E. Ghysens has been appointed city engineer of Verdun, P. Q.

J. J. Carment has been appointed city manager of Kamloops, British Columbia.

J. E. Robertson has been appointed county road engineer of Shelby County, Kentucky, for a 2-year term beginning Jan. 1, 1919.

D. Butler, City Engineer of Spokane, Wash., has been granted leave of absence to enter the service of the War Department as a civilian engineer. He is expected to be given a military commission later.

B. P. Harrison, for the past seven years assistant chief engineer of the Maryland State Roads Commission, has been appointed harbor engineer and president of the Harbor Board of the City of Baltimore. He also becomes a member of the Annex Planning Commission.

Virgil Lee has been appointed city engineer of Anderson, Ind. Mr. Lee was formerly in the office of the county surveyor of Madison County, Indiana.

Henry M. Waite, formerly city manager of Dayton, Ohio, who is now engaged in railway work with the American Expeditionary Forces, has been promoted from lieutenant-colonel to colonel.

Prof. John A. Callen has been appointed to the chair of engineering and architecture at the Alabama Polytechnic Institute, thereby becoming a member of the Alabama State Highway Commission.

OBITUARIES

John Baker, Jr., who has conducted an asphalt business as special agent for the Texas Co., died recently.

Wm. M. Davis, at one time city engineer of Woodstock, Ont., died at Ottawa recently.

Charles A. Miller, City Engineer of Oregon City, Ore., died recently. Before becoming city engineer three years ago, Mr. Miller was engaged in railway work in the Northwest.

The Pennsylvania State Highway Commission is utilizing prison labor from the Beaver and Dauphin County prisons in the construction and repair of roads. In Beaver County, the prisoners are employed on a so-called war road; that is, a section of highway necessary to link up improved roads used by Army truck trains. State Highway Commissioner O'Neil hopes to make arrangements for similar work in other counties.

Repair Work on Minnesota Roads in the Forest Fire Area is to be commenced in the near future. The fires which recently did so much destruction in part of the state damaged many culverts, and available material for their replacement has already been investigated. State Highway Commissioner Babcock and J. H. Mullen and J. T. Ellison, engineers of the State Highway Department, have visited the fire area to make plans for the work that will have to be done.

The Board of Freeholders of Atlantic County, New Jersey, has adopted a resolution providing for the temporary improvement with glutrin of the present gravel roadways on roads between Elwood and Amatol, and between Mays Landing and Belcoville, permission to undertake to pave these roads having been refused by the State Highway Commission. The Belcoville Road will require about 19,000 gal. of glutrin and the Amatol road about 10,000 gal. Bids for the work are to be received at the November meeting of the board.

The State Highway Commission of Oregon has cancelled advertisements for bids for the construction of 1.5 mi. of macadam surfacing on the Pacific Highway, northerly from the Lane-Douglas County line. This action was taken because of the refusal of the United States Highways Council to grant permission for the purchase of cement, gravel and sand for the construction of a proposed viaduct over the Southern Pacific Railroad tracks at Divide. This crossing is considered one of the most dangerous in the state, and the plan of building an overhead bridge was proposed over a year ago. The railroad company, the state and Lane County entered into an agreement a few weeks ago to erect the structure at a cost of \$25,000.

GOOD ROADS

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Concrete Road Construction*

By WILLIAM W. COX†

The construction of a concrete road appears very simple to the average person who has not made a thorough study and investigation into the essential details entering into the operation from start to finish. Adequate drainage, preparation of subgrade, selection of materials, workmanship and protection, all have an important bearing upon the desired results of obtaining a first-class concrete road.

The all too common practice of placing concrete on a poorly drained grade cannot be condemned too strongly. Simply because of the bearing power or rigidity of concrete

many are inclined to think that the presence of water in the subgrade does no particular harm. A concrete road so placed may show up very well for a short time, but sooner or later the action of frost and the result of heavily loaded vehicles will cause the concrete to crack badly and thus, eventually, result in complete failure of the road. It is, therefore, necessary first to provide good drainage so that the water level in the subgrade is at least 2 ft. below the concrete. All cracks or breaks, however, are not caused by inadequate drainage. Uneven settlement of the subgrade seems to be the cause of the majority of the cracks which develop within a short time after the road is completed. It has been observed that where concrete roads have been

*Paper presented at the tenth annual convention of the Michigan State Good Roads Association, Detroit, Mich., Sept. 3-5, 1918.

†Deputy State Highway Commissioner of Michigan.



A MICHIGAN CEMENT CONCRETE PAVEMENT.

built on new rights of way, where the entire grade was made new, very seldom any longitudinal cracks develop. Likewise, excellent results have been obtained in cases where the subgrade has been graded one year and the concrete placed the next. Also, longitudinal cracks in cuts are at a minimum where proper drainage has been provided. These results are conclusive proof that details of drainage and the detail in construction of the subgrade should not be omitted.

It is well, likewise, that great care be exercised in the preparation of the subgrade so as to eliminate uneven settlement. To do this where narrow fills or turnpikes exist, they should be scarified, plowed and completely leveled and rolled to the full width of the grade before additional grading is done. The earth then should be placed over the full width, in layers not to exceed 1 ft. in thickness, each layer being thoroughly leveled and rolled. Wherever possible, if it does not seriously inconvenience the traveling public, it is recommended that the grading be done far in advance of the placing of concrete. Where light sand is encountered, watering heavily seems to be about the only method of securing satisfactory settlement; but if only spots of sand are found, it is best that the sand be removed and replaced with surrounding soil. In the final preparation of the subgrade prior to the placing of concrete or aggregate, care should be taken to see that it is true to form and to the proper elevations and that all loose earth is sprinkled and rolled. The placing of concrete or aggregates on loose earth or dust cannot be too strongly advised against.

The coarse aggregate should be either good clean gravel or crushed stone.

Gravel should be composed of hard, clean, well graded pebbles, ranging in size from $\frac{1}{4}$ to 2 in. Clay lumps, soft red sandstone or cemented pebbles cause surface defects and, therefore, should be rejected. Properly graded gravel should be approximately as follows:

Passing a 2-in. screen.....	100%
Retained on a 1-in. screen, not less than.....	25%
Passing a 1-in. screen, not less than.....	25%
Retained on a $\frac{1}{4}$ -in. screen, not less than.....	95%

If it is found impracticable to obtain such a grading of gravel, and another grading is used, it should be an even grade in respect to keeping the voids constant.

Crushed stone should be of good angular fracture even run in hardness, and when tested by the standard method should show a toughness of at least 8 and a French coefficient of wear of not less than 10. Some of our limestone deposits, if handled with care, can be used for coarse aggregate. Crushed cobbles or field stone, when properly sorted, can in many localities be used to distinct advantage. Stone which, when crushed, spalls or pulverizes considerably, of course should be sorted out.

In the selection of both crushed stone and gravel, coated or dirty material should be rejected, even though the percentage of clay or silt is comparatively small. The range in size, even run and percentage of voids for crushed stone, should be about the same as for gravel.

Fine aggregate should be practically clean of silt, clay or loam and graded approximately as follows:

Passing $\frac{1}{4}$ -in. screen.....	100%
Retained on No. 20 sieve, not more than.....	60%
Retained on No. 20 sieve, not less than.....	20%
Passing No. 30 sieve, not more than.....	20%

A coarser sand is recommended when used with crushed stone. Cement should meet the requirements of the standard specifications for Portland cement adopted by the American Society for Testing Materials in 1916.

Water should be free from oil, acid, alkali or vegetable matter and fairly free from clay or silt.

The batch mixer is considered the standard and should be so equipped that the number of revolutions for a given length of time can be easily obtained.

The forms should have a straight surface and should be set to a true grade and so thoroughly staked in place that no movement can take place when concreting and finishing is being done.

The amount of labor used in the laying of the concrete should be such that every detailed operation can be completed at the proper time and so that the whole is a steady progression. The more nearly the proportions of coarse and fine aggregates and the proportion of cement and the consistency of the batches can be made uniform, the more certain that the concrete when seasoned will give an even resistance to wear. The amount of water used in the mix should be just enough to insure that the mixer will completely discharge its batch to the conveyor. Concrete containing the proper amount of water requires considerable shoveling in place. Alternate dry and very wet batches will cause unequal shrinkage in the body of the concrete, and hence a wavy and unsatisfactory surface. More depressions are caused in the surface by the use of too much water than in any other way.

The subgrade should be well saturated before placing the concrete so as to avoid losing too much moisture before the finishing is complete.

The finishing of the concrete, after being shoveled in place, should proceed immediately. It should be surface struck by a rigid template a few times over and then allowed to stand a few minutes until the surplus water comes to the top. The use of a roller of the Macon type has proven a great help in the finishing of the concrete surface. By its use, the excess water and air are brought to the surface, hence a denser concrete is the result. Another great advantage in using the roller is that the ridges and depressions made by the template are entirely removed by rolling a few times. It should be operated, however, with care and judgment so as not to roll out the crown or make heavy depressions in the surface next to the forms. Although the split roller is used in bringing the concrete to the same height on both sides of the joint, nevertheless a split float and template should be used also. The rollers which seem to be the most satisfactory are about 15 in. in diameter, 5 ft. long and weigh about 75 lb.

Cracks and joints are admitted to be the weak points of a well constructed concrete road, hence great care should be used in placing the joint and finishing the concrete adjacent to it. After a joint is placed and the striking of the concrete progresses towards the joint, there is usually an excess of concrete which has to be removed, hence considerable puddling and working of the concrete is necessary in order to have the surface true to cross-section. On the opposite side of the joint or at the beginning of the section, the striking of the concrete does not cause very much puddling, hence the shrinkage is considerably more and the result is a high and low side at the joint. It is, therefore, recommended that striking the concrete should proceed toward the joint enough so as to give about the same puddling effect on both sides. The joint should then be finished with a split float and template so as to finish both sides at the same height.

Because of the trouble encountered in finishing the open joint many authorities are now advocating the concealed joint which is placed so that the top of the joint is not more than $\frac{1}{4}$ in. below the surface. When concealed joints are used they should be held in place as near the surface as possible so that the joint filler will be forced out when the concrete seasons and expands.

After rolling is completed, the surface should be floated with a wooden float or belted to a rough finish. Considerable trouble is often encountered when belting is tried, due to the fact that inexperienced men attempt to belt when

(Continued on page 169.)

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Copy for advertisements must reach the New York office by noon on Tuesday of the week before date of issue if proofs are to be submitted.

Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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No.
18

CAMPAIGN OPENED FOR A ROAD BOND ISSUE IN WASHINGTON

As noted on another page, there has been inaugurated in Washington a campaign for a state road bond issue.

The plan proposed, though designated as the "Carlyon \$30,000,000 motor revenue bonding plan," seems to follow very closely the one which will be voted upon in Illinois next Tuesday. Like the Illinois issue, it is to be paid from motor vehicle fees, increased to meet the cost. Again like the Illinois proposition, it contemplates postponing actual work until after the war.

From the information at hand, the proposal seems sound and worthy of the support of the people of the state. Good roads are not luxuries, but necessities, and as time goes on they will be more and more necessary. The transportation of the future promises to be largely highway transportation, and the state with a well laid out system of improved roads will be able to measure its prosperity very largely by that system.

ROAD BONDS IN PENNSYLVANIA

On next Tuesday the matter of issuing bonds to provide \$50,000,000 for road building again will come before the voters of Pennsylvania.

Five years ago the proposition was defeated at the polls, the opposition of the State Grange being largely responsible. Since then Pennsylvania has done a large amount of work, but has not been able to achieve anything like the completion of a comprehensive system of improved trunk highways.

In even the short period that has elapsed since the election of 1913 there have been great developments in the road building field. Highway transportation has had a new birth and highway betterment has been undertaken on an ever increasing scale in an effort to provide roads for the traffic.

The benefits of good roads are better understood and more generally realized now than they were five years ago. The Pennsylvania State Grange, however, is still opposed to a bond issue, though better highways have benefited no class more than the farmers.

With the Grange as an organization lined up against the Pennsylvania bond issue, it will be interesting to note whether its narrow views will have sufficient weight with the individual farmers to bring about the defeat of the measure.

SHALL WE LIMIT THE USEFULNESS OF THE ROADS?

The matter of limiting the loads that shall be carried arises sooner or later wherever the improvement of highways is undertaken. As a general thing, road builders favor such restrictive measures, while, naturally, road users are aligned solidly against them. Which attitude is right? Or does the solution involve a compromise?

When road improvement was first undertaken on a scale that gave promise of real results, traffic conditions were very different from those of the present. The motor-driven vehicle was not a factor in transportation. Speed, therefore, did not enter into the road builder's problem, and the total weight of load required—and received—comparatively little attention. Roads wore out, to be sure, but only very slowly if measured by modern standards.

The development of the automobile and the motor truck as carriers of passengers and freight changed all this. High speeds and heavy loads became commonplace instead of unusual, and the roads built for light, slow vehicles, carrying light or only moderately heavy loads, began to deteriorate with alarming rapidity. The result has been that while road builders have been developing construction and maintenance methods to meet the situation, they have also made efforts to solve the problem by legislation placing limits on the traffic. There is hardly a state that has not enacted or considered laws of this nature, and in foreign countries the question has attracted much attention.

Railroads have been confronted with a similar situation. As the volume of freight business increased and the demand for faster and faster passenger service arose, locomotives were built to draw longer, heavier trains and to attain greater speed, and cars of greater weight and capacity were built. These could not be used on the existing tracks, and it became necessary to strengthen the roadbeds and put down heavier and stronger rails.

Conditions in a way comparable arose in waterway transportation. Larger and larger carriers have been built, necessitating the deepening and widening of channels, the construction of longer docks and the making of extensive and costly harbor improvements.

Highway transportation is yet in its infancy, but the war has started it on a growth that will unquestionably make it of greater importance than either railway or waterway transportation.

In both railroad and waterway transportation the development of traffic has been kept pace with by the development of methods of taking care of it. The railroads have made over their roadbeds to suit their rolling stock; the waterways have been adapted to the needs of the carriers traversing them.

Shall roads be built to accommodate the traffic, or shall the traffic be trimmed to suit the roads, thus limiting their usefulness?

A CATALOG OF SNOW HANDLING MACHINERY

On another page of this issue there is a brief notice of a catalog of snow handling machinery recently put out by one of the leading road machinery manufacturers.

The notice is brief—about a dozen lines in length—and at first thought it may seem of little moment that a catalog of that kind has been issued. But we believe that it is symbolic of a new era in transportation.

A year ago few road builders or road users had ever

given much thought to winter transportation over country roads. It was taken as a matter of course that highways outside of cities should be practically unused for two or three months of every twelve.

What happened last winter is a matter of record now. It will probably be repeated, and on a large scale, during the coming winter. And in the winters to come further progress will be made in keeping open the nation's highways, until

eventually highway transportation will be as much a 365-day business as is railway transportation.

So far as we know, the publication to which reference has been made is the first catalog devoted entirely to machinery for clearing snow from highways; we are certain that it will not be the last. And we know that the builders of road machinery will meet the demand for equipment to keep the roads open throughout the year.

Minnesota Trunk Highways

State Highway Department Designates 30 Through Routes with a Total Length of 6,500 mi.

The Minnesota State Highway Department has completed laying out a trunk line highway system comprising 6,500 mi. of road. The system is divided into 30 main roads or trails, many of which have been promoted by organizations which have made considerable progress in marking them. According to advices from St. Paul, the proposed system is so laid out that 95% of the people of the state live within 5 mi. of the roadways included.

Brief descriptions of the various highways, with partial lists of the cities and towns through which they pass, follow:

The Duluth-Fargo Highway crosses the state from east to west, connecting Duluth with Moorhead and extending on to Fargo, N. D. It passes through Aitken, Brainerd, Staples, Perham and Hawley. The marking of the route is a black diamond on a white background.

The Jefferson Highway is part of a projected route from New Orleans to Winnipeg and passes through Minnesota in a northerly and southerly direction from the state line south of Albert Lea to St. Vincent. It is marked with the letters "J. H.," the perpendicular line of the "J" forming the first perpendicular line of the "H." It passes through Faribault, St. Paul, Minneapolis, East St. Cloud, Little Falls, Wadena, Park Rapids, Bemidji, Red Lake Falls and Hallock.

The Minnesota Scenic Highway begins at St. Paul and circles the northern half of the state. Its mark is a white star in a red circle on a blue background. It passes through Elk River, Brainerd, Walker, Cass Lake, Black Duck, Big Falls, Little Fork, International Falls, Loman, Central, Warroad, Greenbush, Karlstad, Stephen, Warren, Crookston, Moorhead, Hawley, Lake Park, Detroit, Perham, Henning, Alexandria and St. Cloud.

The Yellow Stone Trail crosses the southerly portion of the state from Lakeland to Ortonville and thence to the state line and Sisseton, S. D. It is marked by yellow signs carrying a black arrow in a black circle. It passes through St. Paul, Minneapolis, Glencoe, Olivia, Granite Falls, Montevideo and Odessa.

The Red Ball Route extends southerly from St. Paul, following the Jefferson Highway for a part of the distance and reaching the Iowa state line near Austin. It is marked with a red ball on a white background and passes through Faribault, Owatonna and Blooming Prairie.

The Black and Yellow Trail crosses the state from east to west from a point on the state line opposite La Crosse, Wis., to a point on the state line near Lake Benton and thence to Elkton, S. D. It is marked with two horizontal bands of black separated by a band of yellow. It passes through La Crescent, Rochester, Owatonna, Waseca, Mankato, New Ulm, Springfield, Tracy and Burchard.

The Nelson Trail extends from Bemidji to the Iowa border, south of Worthington. It is marked with a black "N" in a black circle on a yellow background. It passes through

Lake Itasca, Park Rapids, Wadena, Glenwood, Starbuck, Montevideo, Granite Falls, Marshall, Tracy and Slayton.

The National Parks Highway crosses the state diagonally from La Crescent to Moorhead. It is marked by two white horizontal bands separated by a band of red. The letter "N" appears on the top band; the letter "P" on the middle band, and the letter "H" on the lower band. It passes through Winona, Minnesota City, Wabasha, Red Wing, St. Paul, Minneapolis, St. Cloud, Sauk Center, Alexandria, Fergus Falls and Barnesville.

The Glacier Trail extends from Minneapolis to the state line near Breckenridge. It is marked with a blue sign bearing a picture of the Glacier Park goat in black within a black circle. It passes through Waverly, Dassel, Willmar, Morris, Herman and Campbell.

The Yankee Doodle Trail connects Witoka with St. Paul. It is marked by a blue sign carrying the words: "Yankee Doodle Highway, Winona to St. Paul. Step Lively." It passes through Winona, Wabasha, Red Wing and Cannon Junction. It follows the route of the National Parks Highway a part of the way.

The Burlington Way is part of the route extending from New Orleans to St. Paul, which, it is expected, will be extended to Duluth and thence to Port Arthur, Ont. It is marked by two bands of white separated by a band of orange. Through Minnesota it passes through York, Spring Valley, Pine Island, Cannon Falls and Westcott. It is said that the routing south of Rochester may be changed to follow state and federal aid highways.

The Daniel Boone Trail is part of the route between St. Paul and Des Moines, Ia. It is marked with the letter "B" painted in black within a larger "D" on a white background. It passes through Fort Snelling, Ottawa, Mankato, Winnebago, Blue Earth and Elmore.

The La Crosse-Sioux Falls Air Line crosses the state from east to west through the southern tier of counties, passing through La Crescent, Spring Valley, Albert Lea, Blue Earth, Fairmont, Sherburn, Worthington and Luverne.

The Chippewa Trail extends from Elizabeth in the Lake Park region, northerly through Detroit to Brooks, where it connects with the Jefferson Highway. It is marked by the letters "CPA" connected with a horizontal line, painted in black on a white background. It passes through Erhard, Detroit, White Earth, Waubesa, Erskine and Cisco.

The Glacier National Parks Highway extends from Port Arthur, Ont., along the north shore of Lake Superior to Duluth and thence westerly across the state through the Minnesota National Forest to Grand Forks, N. D., and thence westward to the Glacier National Park. It is marked with two horizontal white bands separated by a band of red. In Minnesota it passes through Howard, Grand Marais, Beaver Bay, Two Harbors, Duluth, Grand Rapids, Deer River, Bemidji, Wilton, Shevlin and Crookston.

The Twin Cities-Duluth Highway connects St. Paul and Minneapolis with Duluth. It is marked by two horizontal bands of white separated by a horizontal band of black. It passes through White Bear, Rush City, Hinckley, Otter Creek and Proctor.

The Chaska-Winthrop-Marshall Way extends from Minneapolis to Marshall and passes through Chaska, Norwood, Winthrop, Fairfax, Redwood Falls and Vesta.

The L. T. K. Trail traverses the southeastern portion of the state diagonally, connecting La Crosse, Wis., and Kansas City, Mo. The letters "L. T. K." are printed in black on a white background, being the initial letters of La Crosse, Tama and Kansas City. It passes through Hokah, Caledonia, Spring Grove, Prosper and Harmony.

The King of Trails is a north and south route extending along the western boundary of the state. It is marked by the letter "K" and above the letter "T" painted in black on a white background. Starting at the international boundary near St. Vincent, it passes through Hallock, Argyle, Crookston, Halstad, Moorhead, Breckenridge, Ortonville, Lake Benton, Pipestone and Ask Creek.

The Diagonal Trail is a route between Sioux Falls, S. D., and Danville, Ill. It traverses the southwestern corner of Minnesota, passing through Manly, Luverne, Adrian, Worthington and Round Lake. It is marked by a diagonal white stripe crossing a wide black band.

The Mississippi Scenic Highway extends across the southeastern part of Minnesota, passing through La Crescent, Caledonia and Eitzen. It is marked by a wide white band bordered at the top and bottom by narrow blue bands connected by a perpendicular stripe.

The Red Wing-Mankato-Worthington Way passes through the cities named and also through Cannon Falls, Northfield, Faribault, Mankato, St. James, Mountain Lake and Brewster, connecting at Worthington with the Diagonal Trail and with the Nelson Trail.

The Jim Hill Highway connects the Iron Range with the Twin Cities and Des Moines, Ia. It passes through the following towns: Virginia, Hibbing, Grand Rapids, Swan River, McGregor, McGrath, Mora, Minneapolis, Jordan, Montgomery, Waseca and Albert Lea.

The Miller Trunk Line connects Duluth with Virginia and is intended for through traffic from the Iron Range. It is marked by two horizontal white bands separated by a green band.

The Brainerd-Osakis-Sisseton Cutoff extends southwestwardly from Brainerd, Minn., to Sisseton, S. D., and passes through Little Falls, Long Prairie, Osakis, Alexandria, Glenwood, Starbuck, Morris, Graceville and Brown Valley.

The Bob Dunn Highway extends from Taylor's Falls to Sioux Falls, S. D. It passes through North Branch, Princeton, St. Cloud, St. Joseph, Cold Springs, Paynesville, Willmar, Granite Falls, Marshall, Lake Benton, Pipestone and Jasper.

The St. Cloud-New Ulm-Algona Short Line extends from St. Cloud to Algona, Ia., through Dassel, Hutchinson, Gaylord, New Ulm and Fairmont.

The Twin Cities-Watertown-Black Hills Trail extends over the Yellowstone Trail from Minneapolis to Granite Falls and thence westerly toward the Black Hills through Clarkfield, St. Leo and Canby.

The Clover Leaf Route connects Grand Rapids and Brainerd, passing through Cohasset and Remer. Its mark is a four-leaf clover painted in green on a white background.

The Des Moines-Spirit Lake-Itaska Way is a proposed trail from Des Moines, Ia., to the headwaters of the Mississippi, following the Jefferson Highway through Itaska Park to Wadena and thence southerly through Eagle Bend, Long Prairie, Sauk Center, New London, Willmar, Redwood Falls, Windom and Jackson.

Concrete Road Construction

(Continued from page 166)

the surface is too wet, or attempt to belt too fast. It is rather difficult to describe the exact procedure in belting, or just when to belt, but both can be easily learned by perseverance and observation.

During hot weather or when evaporation is rapid, the surface should be protected by canvas until hard enough to permit sprinkling and covering with earth.

Different combinations of aggregates, varying conditions of weather, and different brands of cement, as well as sub-soil conditions seem to cause concrete to behave much differently from other combinations. The mixing, placing and finishing of concrete made from crushed stone and sand are considerably different from those operations when gravel and sand are used. Concrete laid in hot weather behaves far differently from that laid in cool weather.

The use of expansion joints is still a debatable question. The distance between joints varies considerably, but experience seems to indicate that a 1/4-in. joint every 50 ft. is adequate. Concrete which is laid in the fall seems to expand the following summer more than concrete which is laid during hot weather. Thus the concrete road question is a live and debatable subject.

Notwithstanding all the various points in view, I think we are safe in saying that 75% of failures and unsatisfactory results in concrete roads could be entirely eliminated if the essential details of good practice and construction were thoroughly observed.

Minnesota Roads Burned

Forest Fires Destroy Road Surfaces by Burning Out Peat

One of the strangest phenomena attending the forest fires that raged in northern Minnesota recently, according to State Highway Commissioner C. M. Babcock, is the destruction of some of the roads in the devastated area.

Commissioner Babcock, who has recently visited the burned district, explains the action by the presence of peat in the roadbeds. This material has been consumed in some places, leaving the roads in very poor condition.

"We shall have to call upon our state highway reserve fund to make repairs," Commissioner Babcock said in discussing the situation. "Without waiting for authorization, the commissioner has the right to spend money from this fund for county roads, taking the money out of the county's succeeding allotment. This will be done in the fire region, but I will ask the Legislature to reimburse the fund, which is a revolving one, rather than call on the already sorely pressed counties involved."

Road Bond Issue Proposed in Washington

Thurston County Roads Association Advocates the Carlyon \$30,000,000 Motor Revenue Bond Plan

The County Good Roads Association of Thurston County, Washington, has inaugurated a campaign for a \$30,000,000 state bond issue for the improvement of a 2,000-mi. system of main roads.

The plan proposed by Dr. P. H. Carlyon, of Olympia, contemplates the issuance of \$30,000,000 bonds to be repaid within 20 years by increased taxes upon motor vehicles. It is proposed to complete the system within six years from the end of the war, funds for retiring the bonds to be secured by an average increase of \$7.50 per year in motor vehicle fees. It is estimated that a sliding scale of fees of

this average will yield enough money within the 20-year period to retire the bonds, pay all the expenses of the motor vehicle department, and leave a surplus.

A bill, embodying the plan is to be submitted to the next Legislature for consideration, as a referendum will be required to make the bonding feature law.

The Pennsylvania Bond Issue

Senator Sproul Endorses Bond Issue of \$50,000,000 in a Letter to the Associated Highway Organizations

Senator Sproul, Republican candidate for governor of Pennsylvania, in a recent letter to the Associated Highway Organizations of the state, expressed the hope that the election Tuesday would result in the approval of the \$50,000,000 road bond issue. Senator Sproul said in part:

"I hope to make the realization of a good roads program in Pennsylvania one of the principal efforts of my administration, if I am successful at the election. What we can do, of course, depends upon the general industrial situation and the availability of labor. I think, however, that the war will be over within a few months, and that within a year, perhaps, 2,000,000 or more of our young men will have been released from the army and will be available for their usual occupations, while other millions will be released from urgent war work in this country.

"I hope that there will be no period of unemployment during this readjustment, but, if there should be, it will certainly be a shame if Pennsylvania is not in a position to undertake a great deal of road work. We would then accomplish two important objects—we would get good roads and would also afford employment for our people."

Highways in Venezuela

Large Increase in Available Mileage Made in the Past Eight Years

In 1910, according to Homer Brett, U. S. Consul at La Guaira, Venezuela, in a recent issue of the "Commerce Reports," there were only about 80 mi. of highway suitable for wheeled vehicles in all Venezuela. Since then, however, 390 mi. of new roads have been built and 885 mi. of old roads have been restored to passable condition.

All of this mileage is passable for motor vehicles. There are about 1,600 passenger cars and 30 trucks in the country. The latter are used almost entirely in the cities and for certain special purposes.

Most of the highway transportation is by burro pack trains, ox wagons and two-wheeled mule carts. Trucks have not been able to compete with these for long distance hauling because of the high cost of gasoline, the high wages demanded by truck drivers, the long, steep grades and the inability of local labor to appreciate the value of time or the necessity for keeping a truck moving. According to Consul Brett, a truck driver demands several dollars a day, while one man at a wage of about 70 ct. per day will drive three mule carts.

The government encourages the importation of automobiles by giving them a very low customs classification. Both trucks and pleasure cars are subject to an import duty of 69 ct. per 100 lb. gross weight.

Another Venezuelan consul, Frank A. Henry, of Puerto Cabello, states that since 1910 a total of \$4,732,360 has been spent for roads, and that this sum is 53% of the total expenditure on public works during that period. In 1917, special attention was given to the subject of maintenance.

Iowa Counties Get Motor Funds

Over \$1,500,000 Distributed to the 99 Counties of the State on a Basis of \$1,000 per Township

The motor funds derived from automobile license fees for the year ending Aug. 1, 1918, have been distributed to the 99 counties of Iowa. The total amount was \$1,655,000 and was distributed in two allotments. The first amount allotted was \$446 per township and the second \$554 per township. The amounts to the various counties are as follows:

Adair	\$20,000	Jasper	19,000
Adams	12,000	Jefferson	12,000
Alamakee	18,000	Johnson	21,000
Appanoose	18,000	Jones	17,000
Audubon	12,000	Keokuk	17,000
Benton	20,000	Kossuth	29,000
Black Hawk	18,000	Lee	17,000
Boone	17,000	Linn	20,000
Bremer	14,000	Louisa	12,000
Buchanan	16,000	Lucas	12,000
Buena Vista	18,000	Lyon	18,000
Butler	16,000	Madison	16,000
Calhoun	17,000	Mahaska	19,000
Carroll	16,000	Marion	15,000
Cass	16,000	Marshall	18,000
Cerro Gordo	18,000	Mills	13,000
Cherokee	16,000	Mitchell	16,000
Cedar	18,000	Monona	19,000
Chickasaw	12,000	Monroe	12,000
Clark	12,000	Montgomery	12,000
Clay	16,000	Muscatine	15,000
Clayton	22,000	O'Brien	17,000
Clinton	20,000	Osceola	12,000
Crawford	21,000	Page	16,000
Dallas	16,000	Palo Alto	16,000
Davis	15,000	Plymouth	24,000
Decatur	16,000	Pocahontas	19,000
Delaware	16,000	Polk	22,000
Des Moines	14,000	Pottawattamie	28,000
Dickinson	12,000	Poweshiek	16,000
Dubuque	18,000	Ringgold	18,000
Emmet	12,000	Sac	16,000
Fayette	20,000	Scott	16,000
Floyd	13,000	Shelby	16,000
Franklin	18,000	Sioux	23,000
Fremont	13,000	Story	19,000
Greene	16,000	Tama	21,000
Grundy	14,000	Taylor	17,000
Guthrie	17,000	Union	14,000
Hamilton	17,000	Van Buren	14,000
Hancock	16,000	Wapello	14,000
Hardin	17,000	Washington	15,000
Harrison	20,000	Wayne	16,000
Henry	12,000	Webster	24,000
Howard	12,000	Winnebago	12,000
Humboldt	14,000	Winneshiek	20,000
Ida	12,000	Woodbury	24,000
Iowa	18,000	Worth	13,000
Jackson	18,000	Wright	18,000
		Warren	17,000

Receipts for Automobile Licenses in South Carolina during the current year amount to \$303,192.36, according to a recent statement from the State Highway Commission. The total number of owners' licenses issued to date is 53,500; dealers' licenses, 2,883, and motorcycle licenses, 2,213.

The Board of Supervisors of Nassau County, New York, has apportioned \$882,000 for the repair and reconstruction of various roads in the county. The apportionment provides for work in the town of Hempstead at an estimated cost of \$395,000; in North Hempstead at an estimated cost of \$218,000; in Oyster Bay at an estimated cost of \$171,000; and in Glen Cove City, at an estimated cost of \$98,000.

The Bureau of Highways and Sewers of Pittsburgh, Pa., has undertaken the widening of West Carson St., between the Point Bridge and West Main St., in accordance with plans outlined by the engineers of the War Department. The work is being done under force account by the Highway Bureau, and will provide a 38-ft. roadway, except at one point, where the width will be reduced to 25 ft. The cost of the work is estimated at about \$10,000. The improvement is designed to meet merely the needs of the next two years, so far as they can be met without interfering with the abutting property. Plans for the permanent improvement of the street call for a total width of 70 ft., and involve the removal of portions of buildings along both sides. ..

Who's Who for Good Roads

Men Prominently Identified with Highway Development.

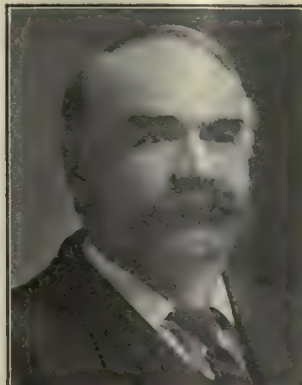
From time to time we print on this page biographical sketches of the men who build the country's roads and the men who develop highway transportation—men who as a class are playing a most important part in the making of the nation. It is our hope that these brief sketches and the portraits that accompany them will serve to bring closer together the earnest workers who are devoting their lives to this work.



W. S. KELLER.



J. N. MACKALL.



S. B. BATES.



L. W. PAGE.

William Simpson Keller State Highway Engineer of Alabama

William Simpson Keller, State Highway Engineer of Alabama, was born at Tuscumbia, Ala., Feb. 20, 1874. He was educated in the local schools, the state normal school, and the University of Alabama, graduating from the latter in 1893 with the degree of B. C. E. In 1917 he was given the degree of C. E. by the same institution.

Upon graduating from the University of Alabama, Mr. Keller took up railroad work, but entered private practice in 1894 and followed it until 1900. From 1900 to 1905 he was assistant engineer of Shiloh National Military Park, with which he had been connected as a transitman during 1895. In 1905 he was appointed chief engineer of the Good Roads Commission of Madison County, Tennessee, and held that position until 1909, when he was appointed superintendent of road construction in the U. S. Office of Public Roads and Rural Engineering. After six months with the office he was again appointed chief engineer of the Good Roads Commission of Madison County, but continued to do special work for the Office of Public Roads.

In January, 1910, Mr. Keller was appointed county engineer of Dallas County, Alabama, and in May of the following year was appointed state highway engineer of Alabama.

Mr. Keller is a member of the American Society of Civil Engineers, the American Association of State Highway Officials, the Alabama Technical Association, and several good roads organizations.

John Nathaniel Mackall

Chief Engineer, Maryland State Roads Commission

John Nathaniel Mackall, Chief Engineer of the Maryland State Roads Commission, was born at Mackall, Calvert County, Maryland, in November, 1885.

Upon graduating from the State College of Agriculture, College Park, Md., in 1905, Mr. Mackall was appointed an inspector with the Maryland Geological Survey. He was appointed office assistant in May of the following year and chief draftsman on Oct. 1, 1907. He remained with the Geological Survey until Aug. 1, 1912, when he was appointed engineer of surveys of the State Roads Commission.

In February, 1917, Mr. Mackall left Maryland to become office engineer of the Pennsylvania State Highway Com-

mission, where he remained until April, 1918, when he was appointed chief engineer of the Maryland State Roads Commission to succeed Henry G. Shirley.

Stoddard Benham Bates

State Highway Commissioner of Vermont

Stoddard Benham Bates, State Highway Commissioner of Vermont, was born in Newport, Vt., Mar. 16, 1864. He received his education in the public schools of Derby, and in Derby Academy.

Commissioner Bates devoted most of his time to farming until appointed to his present office in 1915 by Governor Gates, who was elected governor after serving for several years as state highway commissioner. He was reappointed by Governor Graham in 1917. He has held a number of public offices, including that of county highway supervisor and town road commissioner. He was a member of the Vermont House in 1910.

Commissioner Bates is a director of the National Bank of Derby Line, a trustee of the Derby Academy, and chairman of its executive committee.

Logan Waller Page

Director, Office of Public Roads and Rural Engineering

Logan Waller Page, Director of the Office of Public Roads and Rural Engineering of the U. S. Department of Agriculture, was born at Richmond, Va., Jan. 10, 1870. He was educated at Powder Point School, Bear Island Academy, the Virginia Polytechnic Institute, and Harvard University.

He was geologist of the Massachusetts Highway Commission and director of the testing laboratory of the Lawrence Scientific School of Harvard University from 1893 to 1900, and chief of the Division of Tests of the Department of Agriculture from 1900 to 1905, when he was appointed director of the Office of Public Roads. He has served in that capacity continuously since that time. He is at present chairman of the United States Highways Council, and by virtue of his position as director of the Office of Public Roads has charge of the administration of the federal aid road act.

Director Page is a member of the American Society of Civil Engineers, the American Society for Testing Materials, and served for a number of years as president of the American Association for Highway Improvement.

MOTOR VEHICLE TRANSPORTATION

Return Load Bureaus in Rhode Island Excellent Progress Shown in Report Made by State Highways Transport Committee

As many as fifty calls a day are attended to by the return load bureaus of the Rhode Island Highways Transport Committee at the state house and at the rooms of the Providence Chamber of Commerce, according to a recent statement by Chairman Aldred and Secretary Pierce.

There are now six truck lines operating on a daily schedule, and two lines with services three times a week have recently been established. The six lines maintaining daily service operate between Providence and the cities of Woonsocket, Fall River, New Bedford, Taunton and Waterbury. The two lines recently started operate between Providence and Hartford and Springfield.

The committee is planning a central station for handling small business and is giving attention to plans for snow removal and the matter of overloading trucks. In cooperation with Newport merchants, the committee has put into effect restrictions on retail deliveries. Similar restrictions have been adopted by the merchants in all the important cities and towns of 2,000 or more inhabitants, and in many of the smaller towns as well.

had it brought home to them the many unnecessary uses owner to use his car only for essential purposes, either for business or for trips that will give him the greatest amount of rest and renewed health.

"It is a known fact that during the recent 'gasolineless Sundays' owners spent more time in their garages making adjustments and doing other little bits of service on their car, which they knew should have been made a long time ago, but for which they did not have the time or inclination.

"This practice will effect a great saving from now on, not only in the consumption of gasoline and oil, but in the time of mechanics in service stations. The automobile owner of today is more of a mechanic than he was on the first gasolineless Sunday. He knows his car more thoroughly; he knows what it will do and what it will not do; and from now on he will always have in mind the necessity of saving every drop of gasoline wherever possible. His motor running when idle will strike him as an absolute waste of gasoline; the shutting off the motor when going down hill will appeal to him instantly, and when starting out on trips he will unconsciously select the shortest routes and the best roads.

"All of which has been prompted by these Sundays when he had nothing else to do but hang around the house and tinker with the car."

Motor Trucks Build Southern Roads

Road Commission of Cumberland County, North Carolina, Uses Fleet of Seven Machines

About a year ago the road commission of Cumberland County, North Carolina, purchased a 3½-ton truck for road work. It was used for hauling materials and for operating road machinery. After about four months' experience a second machine was bought and put into service.

The commissioners have kept comprehensive records of the cost of operation and have recently ordered three more of the machines. The fleet of five Federals, two of which are

The Results of "Gasless Sundays"

President of Kissel Motor Car Company Believes Valuable Lessons Were Taught

The interruption of Sunday automobiling at the request of the Fuel Administration has had an effect much greater than the actual saving of gasoline, according to G. A. Kissel, President of the Kissel Motor Car Co.

"In the first place," Mr. Kissel says, "it has made owners realize that gasoline must not be wasted, and second, through observing the Government's request owners have



TWO OF THE FLEET OF FIVE FEDERAL TRUCKS OWNED BY THE ROAD COMMISSION OF CUMBERLAND COUNTY, NORTH CAROLINA.

they made of their cars in which gasoline was consumed. This, in itself, will effect a great saving of gas in the future, but the greatest effect, to my mind, is that it will teach the

shown in the accompanying illustrations, will be used on the county's road work incident to the establishment of a new artillery cantonment at Fayetteville.

M E E T I N G S

Calendar of Coming Meetings

Nov. 21-22.—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Feb. 18-21, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

Southern Appalachian Good Roads Association

The annual meeting of the Southern Appalachian Good Roads Association, scheduled for Asheville, N. C., Nov. 19-21, has been indefinitely postponed. According to an announcement from President A. D. Williams, the decision was made "in interest of public health."

American Road Builders' Association

It has been decided to hold the sixteenth annual convention of the American Road Builders' Association at the Hotel McAlpin, New York, N. Y., on Tuesday, Wednesday, Thursday and Friday, Feb. 18 to 21, inclusive.

There will be an exhibition similar to the one held at St. Louis in February of this year. The sessions of the convention, the exhibition and the headquarters of the association will be in the hotel. The executive committee is working on the plans for the meeting, and expects to make further announcements in regard to the arrangements in the near future.

American Association of State Highway Officials and the Highway Industries Association

A convention under the auspices of the American Association of State Highway Officials and the Highway Industries Association will be held at the Congress Hotel, Chicago, Ill., Monday, Dec. 2, to Friday, Dec. 6, inclusive.

Closed sessions of the state officials' organization will be held on Monday forenoon and afternoon, on Tuesday forenoon and afternoon and on Friday. On Monday evening there will be an open meeting of this organization, and on Tuesday evening it will hold its annual dinner.

Open sessions under the joint auspices of the two associations will be held Wednesday forenoon, afternoon and evening and Thursday forenoon and afternoon. Thursday evening will be devoted to committee work by both associations.

The Highway Industries Association will hold an open meeting on Friday forenoon and an executive session in the afternoon.

The Monday morning session of the American Association of State Highway Officials will be devoted to the consideration of the topic: "The Present Situation and How We Are Meeting It." The speakers scheduled are: Col. W. D. Sohler, Chairman of the Massachusetts Highway Commission; John N. Mackall, Chief Engineer, Maryland

State Roads Commission; W. O. Hotchkiss, Secretary of the Wisconsin Highway Commission; W. S. Keller, State Highway Engineer of Alabama; Ira R. Browning, State Road Engineer of Utah, and Charles F. Stern, of the California State Highway Commission.

The afternoon session on the same day will be devoted to the consideration of construction methods and materials and the topic: "Engineers for Highway Work." The speakers scheduled are: A. W. Dean, Chief Engineer of the Massachusetts Highway Commission; Charles M. Upham, Chief Engineer of the Delaware State Highway Department; Frank F. Rogers, State Highway Commissioner of Michigan; T. J. Ehrhart, State Highway Commissioner of Colorado; Clinton Cowen, State Highway Commissioner of Ohio; Prevost Hubbard, of the United States Highways Council; Clifford Older, Chief Highway Engineer of Illinois, and John H. Mullen, Deputy Commissioner of Highways of Minnesota.

At the open session on Tuesday evening there will be illustrated talks by P. St. J. Wilson, Chief Engineer of the Office of Public Roads and Rural Engineering; W. G. Thompson, State Highway Engineer of New Jersey, and T. J. Ehrhart, State Highway Commissioner of Colorado.

The session on Tuesday morning will be devoted to the topics: "Coordinating State Highway Systems," "Snow Removal from Country Highways," and "Preparing for After We Have Won the War." The speakers scheduled are: C. M. Babcock, State Highway Commissioner of Minnesota; G. H. Biles, Second Deputy State Highway Commissioner of Pennsylvania, and S. E. Bradt, State Superintendent of Highways of Illinois.

The afternoon session on Tuesday will be devoted to the discussion of the topics: "Regulation of Horse-Drawn Vehicles," "Eliminating Grade Crossings with Railroads," "Proper Engineering Treatment of Necessary Railroad Grade Crossings" and "The Maintenance of Sand Roads." The speakers are to be H. C. Beard, Chairman of the Iowa State Highway Commission; W. S. Gearhardt, State Highway Engineer of Kansas; Rodman Wiley, State Commissioner of Public Roads of Kentucky, and George A. Duren, State Highway Engineer of Texas.

The joint session on Wednesday will be devoted to addresses of welcome and responses and to the presentation of two papers as follows: "Highway Control by the Federal Government Under War Conditions," Logan Waller Page, Chairman of the United States Highways Council, and "The Development of Motor Parcel Post Routes," by James I. Blakslee, Fourth Assistant Postmaster General.

At the afternoon session addresses will be made as follows: "Highways—A Neglected War Time Necessity," James M. Cox, Governor of Ohio; "A Suggested National Highway Policy and Plan," E. J. Mehren, Editor, "Engineering News-Record"; "Highway Transportation, Present and Future," Roy D. Chapin, Chairman, National Highways Transport Committee.

At the evening session on Wednesday addresses will be made on the military necessity of highways and the nation's needs for highway development.

The morning session on Thursday will include the presentation of papers as follows: "The Underlying Principles of Laying Out, Marking and Maintaining a State Trunk Highway System," by A. R. Hirst, State Highway Engineer of Wisconsin, and "Proper License Fees for Motor Vehicles and Drivers," H. E. Breed, First Deputy Commissioner of Highways of New York.

Papers scheduled for the afternoon session on Thursday

are as follows: "Motor Truck and Trailer Transportation Essentials—Regulation of Speed, Weight, Width and Height Necessary, but Should Not Restrict Their Expanding Use," George M. Graham, Chairman, Motor Truck Committee, National Automobile Chamber of Commerce, and "American Highways for Tomorrow," by H. G. Shirley, Secretary, Highway Industries Association.

Besides the speakers whose names are mentioned others are scheduled for discussion of practically all of the topics.

At the open meeting of the Highway Industries Association on Friday morning an address on "The Activities of the Highway Industries Association" will be made by Secretary Shirley, and there will be a discussion on the topic: "Conditions We Are Facing," participated in by representatives of various commercial organizations. The executive session in the afternoon will be devoted to committee reports and other business.

PUBLICATION

PHILADELPHIA, PA., PERMANENT COMMITTEE ON COMPREHENSIVE PLANS. Annual report for the year of 1917. Paper, 6x9 in., 18 pages and covers.

This is a general review of the activities of the committee during the calendar year of 1917. Among the matters covered are the Parkway and other street improvement projects.

PORTLAND, ME., COMMISSIONER OF PUBLIC WORKS. Annual report for the year of 1917. Paper, 6x9 in., 74 pages and covers; illustrated.

This report consists chiefly of tabular matter showing the details of the operations of the street department. It is profusely illustrated by full-page half-tone reproductions of photographs, most of them showing the streets before and after improvement.

PERSONAL MENTION

Milton J. Ruark has been appointed engineer in charge of sewers of Baltimore, Md., and will be attached to the highway engineer's department of that city. Mr. Ruark was formerly chief of the municipal bureau of drafting and succeeds Thomas D. Pitts, resigned.

J. Elmer Nelson has resigned as resident engineer for the Oregon State Highway Commission to accept a position as superintendent of construction for the John Hampshire Co., of Grant's Pass, Ore. This company has recently been awarded a contract for the grading of 10 mi. of road on the Pacific Highway in Douglas County, Oregon.

OBITUARIES

Henry J. Widenmann, who succeeded Charles D. Blaney as a member of the California Highway Commission, died early last month as a result of a hunting accident.

William Steyh died recently at Sterling, Colo. Mr. Steyh was city engineer of Burlington, Ia., for a number of years. At the time of his death he was in the employ of the Chicago, Burlington & Quincy R. R. He was born in Germany in 1845 and came to this country when he was 21 years old.

Reid Tull, County Highway Engineer of Spartanburg County, South Carolina, died recently at his home in Spartanburg. Mr. Tull was 33 years old and was formerly city

engineer of Spartanburg. Before coming to that position in 1913 he had been engaged in work with the U. S. Geological Survey, with the Southern Power Co. in railroad work, and as resident engineer for the Greenville, Spartanburg and Anderson Ry. He became county engineer in 1917.

EQUIPMENT-TRADE-MATERIALS

Stegeman Truck Now the Parker

It is announced that the Stegeman Motor Car Co., of Milwaukee, Wis., has been succeeded by the Parker Motor Truck Co.

In the future the machine manufactured by the company will be marketed under the name "Parker."

Truck Governor Booklet

A booklet on governors for internal combustion engines has recently been issued, as "Bulletin 101," by the Duplex Engine Governor Co., of Brooklyn, N. Y.

The booklet is 6x9 in. in size and consists of 32 pages and covers. It contains description of the Company's "Duplex" and "Simplex" governors, and is profusely illustrated by reproductions of photographs and drawings of the governors and views of various trucks equipped with them.

Catalog of Snow Handling Machinery

A catalog of snow handling machinery, designated as Bulletin K. D. T., has recently been issued by The Good Roads Machinery Co., Inc., of Kennett Square, Pa.

The bulletin is 6x10 1/4 in. in size and consists of twelve pages, including covers.

The contents consist of descriptions of "Champion," "Climax" and "Little Wonder" snow plows. The first is made in two models. One is for attachment to motor trucks; the other is a horse-drawn, wheeled machine. The "Climax" and "Little Wonder" models are also horse-drawn machines. The illustrations show the three types of plow and also show the plows in use.

The bulletin is printed in red and black and the half-tone illustrations are of excellent quality.

"Galion Traffic Sign" is the title of a small folder recently sent out by the Galion Iron Works & Manufacturing Co., of Galion, Ohio. On it attention is called to the need for traffic signs, and the type made by the company is illustrated and described. The folder is printed in red, black and blue.

A booklet entitled "Facts About Concrete Roads" has been put out by the Portland Cement Association. It is 6x9 in. in size and consists of 20 pages. The text is devoted to a description of the advantages, the construction and the cost of concrete roads. It is illustrated by many halftones of roads of that type.

"Somewhere in the U. S. A." is the inscription on the outside of a 6x4-in. folder being sent out by the companies comprising the Armco Iron Culvert & Flume Mfrs.' Assn. Thirteen of the 16 pages are used for full-page halftones showing "Armco" culvert and drain installations in army camps. The folder is printed in red, blue and brown, the illustration in the latter color.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
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NEW YORK, NOVEMBER 9, 1918

Number
19

North Carolina Federal Aid*

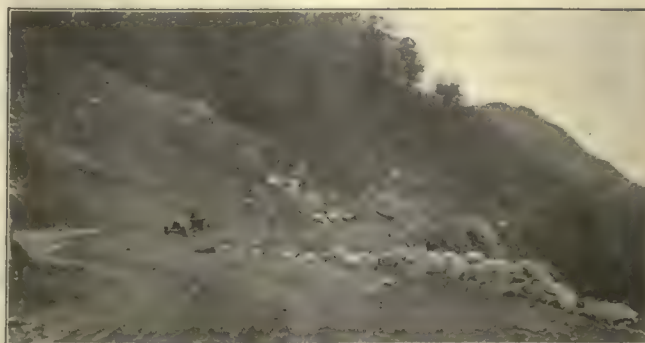
By J. C. CARPENTER †

I assume that the audience has heard enough of the history of the Federal Aid Law and what it is so that I will not explain its intent or dilate on the requirements. It would be well to say, though, that the allotment made to this state for the five-year period covered by the law is \$1,760,000. This comes in yearly allotments, the first being in the amount of \$114,381.92. The amount allotted and ready for expenditure or spent at the present time is \$685,702.23 and of this, \$31,157.65 has been actually paid to the State Highway Commission, leaving \$654,544.58 available at the present time.

* Paper presented at the annual convention of the North Carolina Good Roads Association, Wrightsville Beach, Wilmington, N. C., Aug. 7-9, 1918.

† Highway Engineer, Office of Public Roads and Rural Engineering, U. S. Dept. of Agriculture.

To date, the Secretary of Agriculture has approved 19 project statements, 6 of which are still waiting for the filing of plans and estimates by the state before the final approval can be given and construction started. The amount of federal money that will be paid to the state when the 13 projects now ready for work are finished, will be \$145,696.41. The projects on which plans are being prepared will increase this total by \$52,500. There are now in the Office of Public Roads, under consideration, four projects which will increase the above amounts by \$95,900. The total amount of federal aid that has been opened up for the consideration of the federal office is \$294,096.41, or 43% of the amount that is actually available for expenditure at the present time. The State Highway Engineer has some projects under way



VIEWS ON FEDERAL AID PROJECTS IN NORTH CAROLINA

which have not been presented for inspection, but this represents the ones actually considered.

Of the 13 projects ready for work, 9 have been started. On these nine projects, the amount of federal money paid to the State Highway Commission to date is \$31,157.65, which is less than 5% of the amount available for expenditure at the present time. There are two or three projects on which payments are due which will bring this percentage up to about 8%.

The projects under way are as follows: No. 1 is the Sloan's Ferry Bridge near Charlotte across the Catawba River, between Gaston and Mecklenburg Counties. Ten thousand dollars was allotted to this project and the counties agreed to wait until the construction was finished before the payment is made. The bridge is practically finished and payment should be made within the next six weeks. It has been very ably supervised by Mr. George F. Syme, of the State Highway Commission, and will be a creditable piece of construction when completed.

Project No. 2 is the Hickory-Nut Gap Road in Henderson County. This is a graded road, 20 ft. wide, and all of you are more or less familiar with its history. The road was opened by the Governor on July 4, and traffic has been going over it since then. There is a considerable amount of bridge work to be done on it. There has been paid on this project \$10,331.98, which represents 78% of the total amount allotted.

Project No. 3 is the Swannanoa Gap Road in McDowell County on the Central Highway. The sum of \$10,000 was allotted to this project and \$4,997 has been paid for work done.

Project No. 5 is the road through Icard Township in Burke County. This road is practically complete except for an underpass on the Southern Railway near Icard which is under consideration by the railway company at present. To date, \$5,868.90 has been paid on this job. This is a top-soil road and has been very well built under S. B. Howard, engineer for the State Highway Commission, and Mr. Abernathy, superintendent for the township. With proper maintenance this road should be satisfactory.

Project No. 14 is a gravel road in Halifax County. This was built by contract under the supervision of C. F. Gore, engineer for the county. The work is practically complete and payment of \$3,532.64 has been made.

Project No. 15 is in Guilford County and involves the surface treatment of an old macadam road, which has been completed and paid for, and the construction of top-soil road. The amount paid to the state on this construction is \$2,149.04. No work has been done on the top-soil section.

Project No. 16 is a top-soil road in Haywood County. This also involves a considerable amount of grading. A 30-ft. width of road is being constructed and it is being well executed under the supervision of J. R. Williams, engineer for the State Highway Commission. We have paid \$4,278.09 on this project.

Project No. 19 is a top-soil road in Rockingham County. Construction has been started but no payment has been made.

Project No. 22 is a concrete and penetration macadam road in Alamance County. The county has started construction of the concrete section but has not done enough work to warrant a payment as yet.

The projects which are ready for construction but not started are: No. 6 in North Cove township, McDowell County; No. 11 in Lenoir County; No. 12 in Wayne County, and No. 4 in Craven County, for which the project agreement is now being sent up for signature.

The foregoing may seem like a mass of statistics, which it is, and represents about all of the work that is actually under way. The State Highway Commission is working on projects in Sampson, Cumberland, Polk, Wayne, Wilkes,

Alexander, Yadkin, Person, Burke, Wake, Davidson, Lee, Orange, Union, Buncombe, Mecklenburg, Montgomery, Edgecombe, Nash and Carteret Counties, but the project statements have not come into the office for approval as yet.

The first serious trouble we encountered in working out the law was the preparation of projects in accordance with the requirement as to the mail route situations. The law contemplated the use of the money as aid on the construction of rural post roads and defined these roads as the ones on which U. S. mails now are or may hereafter be transported. This construction has been defined by the solicitor of the department and is now understood to mean those roads on which the mail is actually carried or on which there is substantial evidence that it will be carried at some time within a reasonable period after the road is constructed. We have concluded from experience and from the instructions which have come out from time to time, that it is easily possible to have a project approved if the following conditions prevail: When the entire route is covered by a mail carrier; when about 75% is covered and the rest of it is in a number of short sections so that the road is practically covered throughout its length and it would be considered uneconomical to build the rest of the road without constructing these short sections; when only a small portion of the road is covered, but we can show by statements from the local postmasters that there is an immediate prospect of the road being covered by a mail carrier within a reasonable time of its completion.

The usual procedure is to make arrangements for the inspection of the projects when they are proposed and to look into the mail situation and the importance of the road. If the project is considered one on which there is a good prospect of approval, the surveys and plans can be started at once. If there is any doubt as to the approval of the project, the State Highway Engineer is advised to put in the project statement and wait until an opinion is obtained on the proposition before spending money on the surveys and plans. In this connection, I will say that we have had very little trouble with the mail situation in the past six months, for we are all becoming so familiar with this phase of the problem that we know what will be expected and if there is no mail on the project we go after it and get it.

Another feature of the law which has made a great deal of controversy is the stipulation that the secretary shall approve only such projects as may be substantial in character. This has been interpreted to mean those which are considered substantial after the whole situation is considered, that is, everything in connection with the proposed construction must be taken into account, such as the present traffic, local conditions which might cause an unexpected increase in the traffic, and the value of the material it is proposed to use. Projects have been approved for graded roads without surfacing, but this is the exception rather than the rule. Where the project is a new road and the plans contemplate a well graded road which will be a substantial base upon which some sort of permanent surface can be built later, this has been considered to come within the meaning of the law. Top-soil roads have been approved and constructed where the traffic is not so heavy that this type of construction will fail. One application has been disapproved for the resurfacing of a road with top-soil on account of the fact that this type of construction could not be considered as substantial with the traffic now existing and expected in the near future. This feature has resulted in considerable disappointment, but is the only policy that can be adopted and still meet the requirements of the law. In this connection the Secretary of Agriculture made the following statement on Feb. 17, 1917:

"States may submit for approval any kind of a road, even an earth road, and approval will be given if the construction

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

E. L. POWERS
Editor

T. A. HULBERT
Managing Editor

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Copy for advertisements must reach the New York office by noon on Tuesday of the week before date of issue if proofs are to be submitted.

Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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November 9, 1918

No.
19

THE TRINITY OF TRANSPORTATION

In Secretary Redfield's address at the dinner of the American Road Builders' Association last Saturday night, he laid much stress on the necessity of coordinating the three means of transportation—railways, waterways and highways.

He pointed out a fact that often has been referred to in these columns—that neither of the three alone, nor any two of the three, can take care of the traffic. To a certain extent, they compete, but in order to render the maximum service they must also work together, supplement one another.

How is this to be brought about? Does or does not the solution lie in a united control of the three?

The railways and waterways are already controlled by one authority, the Railroad Administration. As yet highways are under the jurisdiction of various authorities of varying degrees of responsibility and ability. But the Federal Government is taking a greater and greater part in highway affairs and this participation may be expected to increase if pending measures are enacted into law. Though Secretary Redfield did not specially advocate a federal department of "ways of communication," he did not leave his hearers the impression that such a step was beyond the range of possibilities or that he was opposed to it.

Leaving aside the broader questions of government ownership, operation and control, it may not be out of place to consider the desirability of bringing under one head such supervision of railways, waterways and highways as may be exercised. The plan has both advantages and disadvantages.

On the one hand it would doubtless aid in coordinating the functions of the three systems, making each supplement the other two in such a way as to provide an efficient distributing system. On the other hand it might conceivably retard development and improvement by keeping down competition.

Certain advantages would accrue from uniform laws and

regulations, but these might be offset by the lack of opportunity to try out in practice different regulatory schemes.

National control, to whatever degree exercised, would bring with it the advantages in administration that are peculiar to large units—the ability to pay salaries commensurate with the duties and responsibilities of office, for instance. On the other hand, it would make possible the building up of a political machine of gigantic proportions and enormous power for mischief.

So far as road builders are concerned, the coordination of the three "ways" is largely a matter of cooperation between highways and railways. Of late, railroad managements have very generally realized their dependence upon the highways and the necessity for cooperation. This probably can be left to work itself out.

ROAD WORK AND THE LABOR PROBLEM AFTER THE WAR

Making plans for extensive road work after the war has often been urged as a means of providing work for returning soldiers. It is generally agreed that there will be a knotty after-the-war labor problem, but there is a question as to how far towards its solution this plan will go.

One thing seems reasonably sure. The training and experience the average soldier will have before he gets back to this country will make him especially well physically qualified for such work. He will become accustomed to working with his hands, will learn how to use the tools that road laborers use. In addition he will learn how to take orders and carry them out. Officers, especially in the non-commissioned grades and the lower commissioned grades, will learn how to handle men.

But will the soldier care to become a common laborer or a foreman?

Not a few of the citizen soldiers will acquire a liking for army life. If, as seems not unlikely, the United States is obliged to maintain a larger standing army than formerly, these men will naturally elect to remain in the service.

A fairly large proportion of the American Army is made up of men who have never done manual labor. Only a few of those who have left places in stores or offices will care to do anything else after they are mustered out.

Another large class of men, now soldiers, are skilled men from various trades. It isn't likely that many of these will go to work on the roads if they can find work in their own lines. And it seems likely that many kinds of work, such for instance, as the building trades, will require large numbers of workmen as soon as war restrictions are removed.

There remains that part of the American forces made up of common laborers. These men may be counted upon for road work only if wages and conditions in that work are made to compete with those in other lines. In addition to these men, there may be others who will turn to work on the roads only as a last resort when they can find nothing more remunerative or attractive.

For reasons of which those familiar with the transportation situation are cognizant, it is the part of wisdom to make plans now for a great increase of activity in highway improvement after the war. But it does not seem safe to attach great importance to such work as a solution of the great problem of what to do with our discharged soldiers.

As this goes to press, an armistice is being offered to Germany. If she accepts the terms offered, it means peace in the immediate future and makes this problem doubly important because it will so soon demand solution.

Classification of Expenditures for Highway Cost Accounting

Outline of System Proposed in a Recent Publication of the Office of Public Roads and Rural Engineering

A comprehensive and detailed classification of expenditures for use in highway cost accounting is given in "Highway Cost Keeping," a bulletin recently issued by the Office of Public Roads and Rural Engineering of the U. S. Department of Agriculture. It is the work of James J. Tobin and A. R. Losh, engineer economists of the office, and is noted on another page of this issue.

"The first problem in developing a cost keeping system for highway work," according to the authors, "is to devise a general classification of expenditures that will conform to accounts appearing upon the ledger of the organization;

TABLE I.—GENERAL AND PRIMARY ACCOUNTS.

C. M. and R.—Construction, Maintenance and Reconstruction.	
00 to 09.....	Right of way.
10 to 19.....	Grade and roadside.
20 to 29.....	Roadway.
30 to 39.....	Ditches and drains.
40 to 49.....	Bridges and culverts.
50 to 59.....	Supplementary parts.
60 to 69.....	Engineering and supervision
P—Plant.	
70 to 79.....	Plant accounts.
A—Administration.	
80 to 99.....	Administration accounts.

that is, at the outset the cost keeper's records must tie into the bookkeeper's accounts. The ledger, it is well to recall, contains only as debits the funds received or appropriated and as credits the payments made from these various funds summarized from a record which carries the distribution of these expenditures according to subheadings or primary accounts. It is usual to classify accounts as far as possible by departments, or with respect to certain functions for

TABLE III.—PRIMARY ACCOUNTS FOR "P" AND "A."

P—Plant and Equipment.	
70.....	Buildings, fixtures and grounds.
71.....	Quarries, pits, material yards, etc.
72.....	Power tools and equipment.
73.....	Hand tools and equipment.
74.....	Livestock and vehicles.
75.....	Camp equipment.
76.....	Camp buildings and shelters.
77.....	Storage and transportation.
78.....	Miscellaneous.
A—Administration.	
80.....	Executive.
90.....	Maintenance of office.
92.....	Legal.
94.....	Clerical.
96.....	Fiscal.
97.....	Engineering, departmental.
99.....	Miscellaneous.

which funds are provided. Such a classification of accounts provides the first division for the cost keeper. This division gives what usually are known as the general accounts. Numbers or letters are used to represent these accounts, and in these letters or symbols we have the beginning of a code for cost keeping."

The departmental or functional classification suggested consists of five "general accounts" as follows: Construction, maintenance, reconstruction, plant, and administration. The initial letter of each is used in the code which is developed by the authors. These five general accounts are divided into "primary accounts," designated by numbers, as shown in Table I.

The range of numbers given for each of the primary accounts in the table is, of course, to provide for the final subdivision into separate and more or less distinct designations for various operations. It is pointed out that this first

DAILY TIME AND COST RECORD												
ROAD.. <i>B & W</i> ..		SECTION.. <i>4</i> ..				DATE <i>8/29/17</i>						
LOCATION.. <i>On Road</i> ..								G. M. R.				
LABOR OR EQUIPMENT	TIME		HRS.	RATE	TOTAL AMOUNT	CODE 11-59		CODE 23-06		CODE 27-34		
	ON	OFF				HRS.	AMT.	HRS.	AMT.	HRS.	AMT.	
<i>F. Smittie</i>	<i>7:00</i>	<i>5:00</i>			<i>4 40</i>							
<i>Laborer</i> <i>Sent to Rosetta</i>	<i>1</i>	<i>"</i>	<i>4 30</i>	<i>8 1/2</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>2</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>3</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>4</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>5</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>6</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>7</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>8</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>9</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>10</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>11</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 19</i>					<i>11 1/2</i>	<i>3 19</i>	
	<i>12</i>	<i>"</i>	<i>4:00</i>	<i>8</i>	<i>"</i>	<i>3 00</i>	<i>11</i>	<i>75</i>	<i>1</i>	<i>37 1/2</i>	<i>1 88</i>	
	<i>13</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 00</i>					<i>11 1/2</i>	<i>3 00</i>
	<i>14</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 00</i>					<i>11 1/2</i>	<i>3 00</i>
	<i>15</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 00</i>	<i>11 1/2</i>	<i>1 88</i>	<i>1</i>	<i>37 1/2</i>	<i>11</i>	<i>75</i>
	<i>16</i>	<i>"</i>	<i>5:00</i>	<i>9</i>	<i>"</i>	<i>3 37</i>					<i>11 1/2</i>	<i>3 37</i>
	<i>17</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>3 37</i>	<i>11 1/2</i>	<i>3 37</i>				
					TOTAL	6 00		74		47 09		
						23-56		23-61		27-56		
<i>Sent to Rosetta</i>	<i>18</i>	<i>"</i>	<i>9:00</i>	<i>2</i>	<i>3 75</i>	<i>75</i>		<i>11</i>	<i>75</i>			
	<i>19</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>75</i>			<i>11</i>	<i>75</i>			
	<i>20</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>75</i>			<i>11</i>	<i>75</i>			
	<i>21</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>75</i>			<i>11</i>	<i>75</i>			
<i>Engineer</i>	<i>4</i>	<i>"</i>	<i>5:00</i>	<i>8</i>	<i>4 00</i>	<i>11 1/2</i>	<i>1 50</i>			<i>11 1/2</i>	<i>2 50</i>	
<i>Roller</i>	<i>1</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>5 00</i>	<i>11 1/2</i>	<i>5 00</i>					
<i>"</i>	<i>2</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>5 00</i>					<i>11 1/2</i>	<i>5 00</i>	
<i>Team</i>	<i>2</i>	<i>12:00</i>	<i>12:00</i>	<i>2</i>	<i>1 50</i>	<i>1</i>	<i>75</i>			<i>1</i>	<i>75</i>	
<i>Guard</i>	<i>1</i>	<i>7:00</i>	<i>5:00</i>	<i>9</i>	<i>2 80</i>							
<i>"</i>	<i>2</i>	<i>"</i>	<i>"</i>	<i>9</i>	<i>2 80</i>							
<i>Waterboy</i>	<i>2</i>	<i>"</i>	<i>"</i>	<i>9</i>	<i>88</i>	<i>Half time to Rosetta</i>						
					TOTAL	7 25		3 00		8 25		
<i>Mixing Plant closed down at 4 P. M.</i>												
<i>Gang sent to Rosetta</i>												
					TOTAL	83 21						

SAMPLE TIME CARD.

division of the general accounts into primary accounts would be satisfactory for a simple cost system, in which case one number instead of a range of numbers would serve for the code symbol. In such a system ditches and drains, for instance, would be designated by the number 39 instead of the range of numbers from 30 to 39, inclusive.

The expansion of the primary accounts into detailed accounts for construction, maintenance and reconstruction is shown in Table II. A somewhat similar subdivision of the

North Carolina Federal Aid

(Continued from page 176)

be substantial in character, suitable for traffic needs and meets the terms of the Federal Aid Act. To give the state legislatures and highway officials the impression that this department favors only costly types of roads or discriminates in favor of any particular material, results not only in spreading misinformation but in placing barriers in the

TABLE II.—PRIMARY ACCOUNTS AND CLASS CODE FOR "C," "M" AND "R"—CONSTRUCTION, MAINTENANCE AND RECONSTRUCTION.

00.....Right of Way. Preliminaries.	26.....Cushion Course.	Supplementary Parts.
01.....Right of way surveys.	27.....Top course.	50.....Signs and sign posts.
02.....Right of way plans.	28.....Surface.	51.....Monuments.
03.....Real estate.	29.....Miscellaneous.	52.....Guard rails.
04.....Damages.		53.....Curbs.
09.....Miscellaneous.		54.....Retaining walls and parapets.
	Ditches and Drains.	55.....Riprap and revetments.
	30.....Ditches and gutters.	56.....Roadside treatment.
	31.....Ditches and gutters paved.	59.....Miscellaneous.
	32.....Blind drains.	
10.....Cuts and embankments.	33.....Tile drains.	Engineering and Supervision.
11.....Shoulders.	34.....Catch basins.	60.....Location and relocation surveys.
12.....Berms and slopes.	35.....Drainage channels.	61.....Surveys (for operations).
13.....Trees, shrubs, grass, etc.	39.....Miscellaneous.	62.....Plans.
19.....Miscellaneous.		63.....Specifications and contract preparation.
	Bridges and Culverts.	64.....Estimates.
	40.....Foundations.	65.....Expense of awards.
20.....Subgrade.	41.....Abutments.	66.....Office expenses, engineering.
21.....V drains.	42.....Piers and bents.	67.....Supervisory engineering.
22.....Sub-base.	43.....Superstructures.	68.....Inspection and tests.
23.....Base course.	44.....Box culverts.	69.....Miscellaneous.
24.....Intermediate course.	45.....Pipe culverts.	
25.....Binder course.	49.....Miscellaneous.	

general accounts for plant and administration costs is shown in Table III. These are designated as "primary accounts," however, and would require further subdivision to cover details.

In the code system developed by the authors of the bulletin, the various operations involved are listed alphabetically and numbered consecutively. This code is shown in Table IV.

By means of these numerical symbols and the key letters

way of states which wish to avail themselves of federal aid in road construction."

Recent experience with the heavy motor traffic that develops over improved roads makes it imperative that the proposition be carefully considered before a type of surface is recommended. It is to be regretted that there is no well worked out plan for the taking of traffic census in this state, for that would furnish information which would save

TABLE IV.—OPERATION CODE.

00.....Assembling.	25.....Forming.	49.....Plumbing.
01.....Backfilling.	26.....General.	50.....Plowing.
02.....Blacksmithing.	27.....Grouting.	51.....Pumping.
03.....Blasting.	28.....Grubbing.	52.....Quarrying.
04.....Building.	29.....Guarding.	53.....Removing snow.
05.....Building falsework.	30.....Harrowing.	54.....Repairing.
06.....Cleaning.	31.....Hauling.	55.....Riveting.
07.....Clearing.	32.....Heating bituminous materials.	56.....Rolling.
08.....Clearing and grubbing.	33.....Heating materials.	57.....Scarifying.
09.....Cofferdamming.	34.....Laying.	58.....Screening.
10.....Cribbing.	35.....Loading.	59.....Shaping.
11.....Curing concrete.	36.....Loading and hauling.	60.....Spreading bituminous materials.
12.....Crushing.	37.....Loosening.	61.....Spreading materials.
13.....Dragging.	38.....Mixing.	62.....Spreading screenings, sand, or chips.
14.....Drilling.	39.....Mixing and placing.	63.....Sprinkling.
15.....Drilling and blasting.	40.....Moving.	64.....Stripping.
16.....Excavating, borrow.	41.....Operating.	65.....Tamping.
17.....Excavating, common.	42.....Oiling.	66.....Trimming.
18.....Excavating, earth.	43.....Painting.	67.....Washing.
19.....Excavating, loose rock.	44.....Patrolling.	68.....Washing and screening.
20.....Excavating, solid rock.	45.....Pile driving.	69.....Wasting materials.
21.....Excavating, wet earth.	46.....Placing materials.	70.....Waterproofing.
22.....Filling ruts.	47.....Placing steel.	71.....Working on joints.
23.....Filling washouts.	48.....Planting.	72.....Wrecking.
24.....Finishing.		

of the departmental accounts, any specific operation can be indicated by a short and convenient designation. For instance, the construction of a cofferdam around a bridge pier in reconstruction work would be designated as R-42-09, while the painting of guard railings in maintenance work would be denoted by M-52-43 and the grouting of granite block in a new pavement would be indicated by the notation C-27-27. A sample recording form filled in in conformity with this system is shown in the accompanying illustration.

money on construction and furnish a basis on which the engineer could base his calculations with a considerable degree of accuracy. In addition to these features, a traffic census which had been kept for several years would give us an idea of the yearly increase in traffic and something which the State Highway Commission could present to the Office of Public Roads to back up any recommendation that they might make as to the type of road to be employed.

Perhaps it would not be out of place to give you an idea of the organization as now employed by the Office of Public

Roads to work out the Federal Aid Law. The United States was divided into ten districts, making about five states to a district. Some of the western districts have only four states on account of their size, so the eastern districts are larger in the number of states. This is district No. 10 and includes Ohio, Pennsylvania, Delaware, Maryland, Virginia, West Virginia and North Carolina. The district engineer's office is in Washington and H. K. Bishop is the district engineer for this district. Mr. Bishop has assigned the work in North Carolina to an engineer who is to look after the work and see that the projects are in shape before they come into the Washington office, so that there will not be so much delay and return of the data to the state office. It may seem to the outsider that there is considerable delay in the Washington office. It must be remembered that the projects have to be reviewed by the engineers in the district office, forwarded to the chief engineer for review in his office, and when everything is found correct, the necessary papers are prepared and sent to the office of the secretary for his signature. The chief engineer has to consider projects from every state in the Union and the same applies to the secretary. Up to the first of June, 1918, the secretary had approved 601 projects involving 8,000 mi. of road with an estimated cost of \$51,000,000. This does not consider the projects which were submitted for approval and turned down by the Office of Public Roads before submission to the secretary. From this it is evident that a month's time for the review of the plans by the Washington office should not be considered an unreasonable delay. While there are some instances in which it has been advisable to request a rush order on this work, these are exceptional cases, for there are projects in the other states that are as important as those we send in. In one instance in this state the project statement and plans were submitted on May 21 and were recommended for approval by the chief engineer on June 1. The agreement was signed by the secretary on the 25th day of June. The secretary's office has not only road work to consider but all of the enormous business of the Department of Agriculture in addition and, of course, each paper must wait its turn for consideration. This is offered as an explanation, not as an apology, for I believe that the Office of Public Roads can stand on its record for prompt consideration and we can furnish evidence to the effect that there have been no delays in either the Public Roads Office or the office of the secretary.

In conclusion, I wish to say that the Office of Public Roads is here to cooperate with you and aid you in every way it can in the building of good roads, and we consider it a pleasure to assist you in any way we can to attain that end.

Important Ohio Road Completed

Governor Cox Officially Opens Last Link of 25-Mile Section of Old National Highway

The last link in a 25-mi. section of brick paved road on the Old National Highway was recently completed and opened to traffic.

The road is situated in Muskingum County and is the last of about 80 mi. of highway that have been built by the state largely with convict labor, since the first of May. Its completion gives a continuous paved or macadamized roadway from Columbus, Ohio, to Wheeling, W. Va.

Governor Cox officiated at the ceremony of opening the road and in his address referred to the criticism that had been made because the law was ignored in using convict labor on the road.

"The law does not prohibit the use of convict labor," said the Governor. "It does not give specific permission because the emergency never before arose. This was an emergency

call. If I had run about the state with a law book or called the General Assembly into special session, the Government's wishes could not have been met.

"I regarded it as more important to provide for the soldiers overseas than to split hairs over the constitutionality of the action."

Road Work in Indiana After the War

An extensive road building campaign in Indiana after the completion of the war is being planned by Governor Goodrich, according to a report received by a county council of defense. It is said that the state will have accumulated \$2,500,000 by next year and will be entitled to an equal sum in federal aid. It is planned to use this fund and utilize surplus labor from war factories in the building of roads.

Highways on the Island of Trinidad

Motor Truck Transportation Not Yet a Factor but May Be Developed Later

There are about 600 mi. of road suitable for motor trucks on the Island of Trinidad, according to Consul Henry D. Baker, writing in a recent issue of the "Commerce Reports."

The railroads of the island face so heavy competition from coastwise shipping that little effort is made to develop them. The more important towns are situated on the coast and most of the larger estates inland are connected with the coast by roads that will carry cart or motor truck traffic.

At present there are over 750 motor vehicles registered in Trinidad, and about 100 of them are trucks. The latter are not very extensively used for the carrying of freight, but their advantages for such work are beginning to be recognized, and it is probable that when importing conditions become easier, motor truck transportation will be further developed.

Government Wants Engineers' Transits

Ordnance Department Trying to Secure Light Instruments of the "Mountain" Type

The War Department, through the ordnance branch, is trying to obtain light transits of the so-called mountain type for the use of the engineer divisions of the Army. The specifications for the machines are as follows:

Transits, mountain and mining type, complete with split-leg extension tripod. Horizontal circle $4\frac{1}{2}$ in., graduated on heavy inlaid ring of solid silver, two rows of figures, 0 to 360, in opposite directions, figures inclined in the direction verniers should be read, graduations to half degrees. Double opposite, direct reading verniers, reading to minutes, set at 35 degrees to line of sight. Vertical circle 4 in., graduated on solid silver to half degrees, reading by double direct reading vernier to minutes. Circle protected by a guard. Telescope $7\frac{1}{2}$ in., erecting, aperture $1\frac{1}{2}$ in. Stadia wires fixed 1:100. Plate levels of standard length. Needle 3-in. edge bar with no index error. Needle circle graduated from 0 to 360 by half degrees and into quadrants like surveyor's compass. Instrument to have shifting center, gradienter attachment and prism. Leather finish on all large parts and dull finish on small ones, except where such finish would interfere with accuracy of instrument. Each instrument complete in mahogany case enclosed in leather case with shoulder straps, and furnished with sunshade, wrench, screw driver, adjustable plumb bob, magnifying glass, adjusting pin, and metal container for watch oil. Type: Berger's or equal, $4\frac{1}{2}$ -in. mountain and mining transit.

Certain slight variations from these specifications will not prevent acceptance of machines offered. Those having or knowing of instruments meeting the specification should communicate with the Director of Purchase, Storage and Traffic, Ordnance Department, Washington, D. C.

Convict Labor on Maryland Roads

Court Upholds State Board of Prison Control in Injunction Suit Against Convict Labor

Application for an injunction against the State Board of Prison Control and the State Roads Commission was recently denied the Jones Hollow Ware Co., the court upholding the constitutionality of the law authorizing the State Roads Commission to take convicts and place them at work on the state roads.

The Jones Company wished to have the state restrained from employing convicts on road work, on the plea that such action was a violation of its contract with the state. The state, through the Attorney General's Department, filed a demurrer which was sustained by the court.

State Road Work in Rhode Island

Board of Public Roads Bringing Season's Operations to a Close

Several of the important road projects commenced this season by the Rhode Island State Board of Public Roads will be completed by Dec. 1, according to recent advices from that state.

The Mendon Road and the Putnam Pike have already been finished. The post road between Matunuck and Wakefield is expected to be completed by Nov. 15, and the work on Taunton Ave., East Providence, by Nov. 25. The Elmwood Avenue Bridge over the Pawtuxet River at Norwood will be completed and ready for traffic by Dec. 1, according to present plans.

The completion of work on the East Main Road in Portsmouth depends upon the action of the Government in reference to the supply of materials. If stone can be obtained the work will be finished.

The main road between Warren and Bristol cannot be completed and there is little likelihood of finishing the Hartford Pike.

The road from Saunterstown to the Pier is a federal aid job, and it is possible that work will be started this fall. The State Board of Public Roads has been ready for some time to proceed with the work, but has been waiting upon Government rulings.

First Paved Road Between Iowa Cities Completed and Opened

Highway Connecting Mason City with Clear Lake Paved with Reinforced Concrete

A highway that is said to be the first surfaced highway to be built in Iowa as a connecting link between two cities has recently been completed in Cerro Gordo County. The road connects Mason City with Clear Lake and is 10 mi. in length. It is paved with reinforced concrete and cost about \$15,000 a mile.

Work on the road commenced in 1913 when a mile of paving was laid near Mason City. In 1915 a second mile was built between the end of the first mile and the Mason City line. At about the same time Mason City extended the pavement from the city line to the center of the municipality. The portion recently completed is 4 mi. in length and connects the pavement in and near Mason City with the portion in Clear Lake, built later by that city.

The connecting link was built by the county with state and federal aid, and, incidentally, is the first federal aid project designated and completed in the state. It was started in 1917 and was about half finished when construction was stopped by the winter. Work was started again

early last spring, but because of delays due to war conditions was not completed until late in August.

The pavement is of concrete, reinforced with $\frac{3}{4}$ -in. bars, and is $7\frac{1}{2}$ in. thick at the center and 6 in. at the sides. Gravel shoulders 4 ft. wide are to be built later. Most of the materials used were obtained locally. The cement was manufactured in Mason City; the sand and gravel was obtained in Cerro Gordo County, and only a small portion of the aggregate used had to be imported from outside the county.

Winter Traffic on Montana Roads

State Highway Commission to Cooperate with County Authorities

The maintenance of highways in Montana is delegated by the highway law to the county authorities and few of them have made much effort to keep the roads open during the winter, according to advices from the State Highway Commission. In one county motor trucks equipped with snow plows were used last winter to keep a considerable mileage of road passable for traffic, but winter maintenance is the exception rather than the rule.

It is expected that the coming winter will find a considerable quantity of grain awaiting delivery to elevators, and for that reason the State Highway Commission is planning to do all that it can to encourage county officials to keep free from snow such main roads as may be needed for that traffic. The commission also hopes that steps will be taken to give it supervision over the maintenance of state highways and to give it funds for carrying on the work.

Surveys for a Portion of the Lincoln Highway in the Utah Desert were made at night because of the impracticability of working in the dazzling, flickering light during the daytime. The section surveyed in this way is 17 mi. long and crosses a portion of the Utah desert. The work was done by the light of signal fires and construction work is now under way.

Navajo Indians Working on the Durango-Silverton Highway in Colorado, which is being constructed by the Forest Service, left the work in a body recently, because of the influenza epidemic. Practically all of the force of over a hundred employed in the labor camps left the job in a panic on learning of the death of J. A. Kingsley, who had charge of one of the camps.

The Pennsylvania State Highway Department will open no more bids for road work this year, according to recent advices. Most of the work proposed by the department so far has been refused approval by the federal authorities and the department is at present giving its attention to the completion of the maintenance and repair work in hand. The erection of snow fences along the Lincoln Highway is to commence in the near future.

Estimates for 1919 Highway Work in Monroe County, New York, have been submitted by County Superintendent McClintock to State Highway Commissioner Duffey. The estimates show that 730 tons of coal, 36,000 gal. of tar, 48,500 cu. yd. of stone and 8,200 days' labor will be required for the reconstruction of 28 mi. of highway in the various towns of the county. The cost of the work is estimated at \$118,000. For the maintenance of 633 mi. of highway in the towns it is estimated that 680 tons of coal, 56,000 gal. of tar, 39,600 cu. yd. of stone and 8,500 days' labor will be needed. The cost is estimated at \$103,000.

MOTOR VEHICLE TRANSPORTATION.

Good Roads a National Necessity After the War

By G. A. KISSEL *

Without a doubt, every city or town has had brought home to it the value of good roads, and improved highways. Since the United States entered the war, the railroads have been gradually devoting more and more of their equipment to Government requirements, thus leaving millions of tons of goods and supplies for home consumption to be transported and delivered as best they can. The cities whose highway commissioners had the foresight to put through good roads measures and see that they were carried out, had little or no difficulty in coping with these unexpected transportation problems. In such localities the motor truck took up the transportation problems, with no loss of time and with a delivery and haulage expense that was not any greater than the rates paid the railroads, if not lower.

But it is those cities and towns that have let the good roads problems go by, that have paid no attention to them, that are facing acute haulage problems. These are the municipalities whose merchants have great difficulty in keeping their shelves full, in supplying the ordinary wants and necessities of their trade. These are the municipalities which all of a sudden were shut off from the source of supply and as a result, have to pay higher prices for goods on account of the increased cost of transporting them to the points of distribution.

The United States has been in the war for over a year and it would seem that every municipality would have realized by this time the necessity of building good roads to meet the future transportation demands of their respective localities. It was thought at one time that the railroads, after getting from under the first onslaught of Government requirements, would be able to resume the handling of local freight shipments destined for home consumption, but time has proven that such is not the case. With every increase in railroad equipment which factories have been able to build, a corresponding increase in goods to be shipped has been found in every part of the country.

Hence the bad roads municipality has had to struggle along, its merchants and business men paying increased expenses, which in the end are generally borne by the consumer and taxpayer.

With the possibility of this uncertainty on the part of the railroads extending well into the future, it is my opinion that every state should follow the example of that of Illinois in making plans for good roads to be constructed when the war is won. Illinois intends to build sixty millions of dollars worth of good roads. It is estimated that the principal and interest of this sixty million dollar bond issue will be paid in twenty-five years, by the constantly accumulating automobile license fees in the state treasurer's hands. Already there is more than \$2,500,000 available.

Such a plan insures the kind of highways and byways that permit economical transportation of goods by motor trucks after the war, and at a time when undoubtedly the entire reconstructive efforts of the United States will be concentrated on devastated Europe.

Other good points about such a plan are that it will throw open jobs for thousands of returned soldiers, engineers, office men, mechanics, expert road men, and work-

men of every caliber. These men will have returned from "over there," where they have had the best experience in this kind of work, and without a doubt these men will represent the highest developed specialists in work of this character. As a result, their work should be of the highest character and redound to the credit of the cities employing them.

I understand that recently, the Minnesota good roads leaders have started a plan or program along this line for their cities, and undoubtedly the states of the Central West will soon be covered with a network of improved highways, permitting uninterrupted and economical travel and traffic by motor car and motor trucks.

One of the great lessons that the war will teach us is that of good roads. Ask any of the soldiers from "over there" when they return, how they found the roads and highways of Europe, and ask especially those engineers and members of the motor corps, what, in their estimation, was one of the greatest advantages the Allies had in the transportation of food and supplies, and they will state that outside of a never-ceasing flow of motor trucks and equipment, it was the excellent highways that permitted the uninterrupted use of this equipment. I believe it is up to us to take this lesson to heart and apply it while we have time.

Winners Announced in Packard Efficiency Contest

The Packard Motor Car Co. has announced the names of the winners in the truck efficiency contest carried on by it during the three months ending Sept. 1.

This contest, as was noted in "Good Roads" for June 1 and other dates, was open to both owners and operators. Trucks were entered according to their capacities, grouping together in class "A" 1½ and 2-ton trucks, in class "B" 3-ton and 4-ton trucks, and in class "C" 5-ton and 6-ton trucks.

Winners of \$1,000 awards were the What Cheer Chemical Co., Pawtucket, R. I., class A; H. F. Cherigo & Sons, Baltimore, Md., class B; and the W. M. Hoyt Co., Chicago, Ill., class C. Second awards went to Edson, Moore & Co., Detroit, Mich.; the Salt Lake City Pressed Brick Co., Salt Lake City, Utah, and the Gottfried Krueger Brewing Co., Newark, N. J.

Third awards were won by Edson, Moore & Co., Harper & Wilz, Baltimore, Md., and H. F. Cherigo & Sons.

Prizes amounting to about \$5,000 were awarded to winning drivers, and, in addition, drivers took \$3,625 in prizes put up by seven dealers.

Weather Forecasts to Aid Winter Motor Truck Hauling

Motor truck hauling on a portion of the Lincoln Highway between Pittsburgh and Harrisburg, Pa., is to be aided by daily weather forecasts from the U. S. Weather Bureau.

According to the plan which is being carried out by the Department of Agriculture and the Pennsylvania State Highway Commission, assistant superintendents of highways, at points along the route, will report to the Weather Bureau at Pittsburgh each morning, by telegraph or telephone, giving the depth of snow on the highway and a report on general condition. These reports will be published in the newspapers and furnished to different automobile clubs. Forecasts and warnings are to be telegraphed

* President, Kissel Motor Car Co.

to the superintendent of highways at Harrisburg, who will thus be enabled to give instructions to his force along the road to prepare for the anticipated conditions. This service was operated last winter and give satisfaction.

According to the Department of Agriculture, the Weather Bureau is ready to give similar service, if desired, on other truck routes.

Highway Transportation and Potential War Work

Statement by the Highways Transport Committee of the Council of National Defense

The enactment by Congress of the new draft measure, coupled with the nation-wide movement of the United States Employment Service in surveying the potential man power of the country, both of these pointing unerringly to the supreme demand of the hour, man power to the nation's limit, have driven home the vital character of the activities supplementing these calls upon the country's resources, among which are those being daily brought into motion by the Highways Transport Committee, Council of National Defense.

The highways transport committees in their work are thus carrying out the views recently outlined by the President in emphasizing "the value of extending our defense organization into the smallest communities." The President's view characterizes as "truly democratic" this system of bringing together the individuals of the country into movement looking to the furthering of the dynamic force which is carrying the nation forward to victory.

The gravity of the situation, and the potential aid of which the Highways Transport Committee is capable in relieving freight congestion, is recognized by Maj. George W. Goethals, Assistant Chief of Staff, United States Army; in a letter to the state highways transport committees, in which he points particularly to the aid being given by such committees in helping to increase the nation's transportation facilities by the development of efficient and effective highways transportation.

Further force has been given to recognition of the aims and policies of the committees along food conservation lines by United States Food Administrator Hoover, who, following his recent return from a survey of food conditions abroad, strongly emphasizes his previously expressed views as to importance of all efficiency possible in the transportation of foodstuffs.

M E E T I N G S

Calendar of Coming Meetings

Nov. 21-22.—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Dec. 2-6.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Dec. 4-6.—Highway Industries Association.—Convention, Chicago, Ill. Secretary, Henry G. Shirley, 302 Maryland Building, Washington, D. C.

Feb. 18-21, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

American Road Builders' Association

The date of the sixteenth annual meeting of the American Road Builders' Association has been changed from Feb. 18-21, 1919, to Feb. 25-28.

The change was made by the executive committee at the suggestion of the hotel management. It was pointed out by the latter that because of the volume of commercial business New York hotels had to accommodate during the early part of February, better cooperation with the association could be given later in the month.

Annual Meeting

The annual meeting of the association was held Saturday afternoon, Nov. 2, and was followed by the annual get-together dinner that evening. A meeting of the board of directors preceded the members' meeting. The chief business of the meeting was the canvass of the ballots for officers and the reception of reports from officers and committees. The election resulted as follows:

President, Arthur H. Blanchard, consulting highway engineer, New York, N. Y.; First Vice President, Paul D. Sargent, Chief Engineer, Maine State Highway Commission;

Second Vice President, Maj. R. Keith Compton, Ex-Chairman, Paving Commission, Baltimore, Md.; Third Vice President, S. E. Bradt, Superintendent of Highways, Illinois Department of Public Works and Buildings; Fourth Vice President, Austin B. Fletcher, Highway Engineer, California State Highway Commission; Treasurer, James H. Macdonald, Ex-State Highway Commissioner of Connecticut; Secretary, E. L. Powers, Editor, "Good Roads."

Directors: R. A. Meeker, Ex-State Highway Engineer of New Jersey; Lieut. Col. W. D. Uhler, Ex-Chief Engineer, Pennsylvania State Highway Department; Col. W. D. Sohler, Chairman, Massachusetts Highway Commission; Charles J. Bennett, State Highway Commissioner of Connecticut; Col. W. W. Crosby, consulting engineer, Baltimore, Md.; Frank F. Rogers, State Highway Commissioner of Michigan; C. C. Rolling, County Highway Commissioner, Shawano County, Wisconsin. Col. Crosby is director for the Southern District and Commissioners Rogers and Rolling represent the Central District. The others are for the Northeastern District.

The board of directors has voted to accept the invitation of the Highway Industries Association to cooperate in its joint convention with the American Association of State Highway Officials at Chicago next month and to send delegates to that meeting.

Get-Together Dinner

About a hundred members attended the annual get-together dinner at the Automobile Club of America, New York City, on Saturday night. The chief speaker was William C. Redfield, Secretary of Commerce. The retiring president, H. E. Breed, First Deputy State Highway Commissioner of New York, presided until after the speaking, when he relinquished the chair to Prof. Blanchard, the new president. Among the speakers, besides the president and the retiring president, were Lieut. Col. H. M. Bowlby, of the 43rd Engineers, U. S. A.; C. M. Upham, Chief Engineer of the Delaware State Highway Department; G. C. Warren, President of the Warren Brothers Co.; F. E. Ellis, Manager, Essex Trap Rock and Construction Co.; J. R. Draney, Sales Manager, U. S. Asphalt Refining Co., and A. T. Rhodes,

Field Engineer, Granite Paving Block Manufacturers' Association.

In opening the evening's program Mr. Breed spoke briefly, thanking the organization for its support of him as president, touched upon the effect of the war upon road work, and, therefore, upon the association's activities, and expressed the belief that the A. R. B. A. has a great part to play in the work that will have to be done after the war.

Chief Engineer Upham told of the work done in Delaware during the season and of the difficulties that have been encountered. In spite of these, he said, about 35 per cent. of the 1918 program has been completed. The department is now preparing for peace, he said.

Mr. Warren's address dealt with the progress of the good roads movement during the past few years and with the probabilities of the years to come. The Government is taking a more active part in road work than it ever did before, according to Mr. Warren. He believes that road building will receive a great impetus after the war and that it will be a great factor in the solution of the labor problems that the county will have to meet.

Secretary Redfield's address was a strong argument for the building of roads to suit the traffic instead of attempting to adapt the traffic to the existing roads. He traced the development of transportation in this country by waterways and railways and pointed out that in both cases it was the result of the improvement of the carriers, logically followed by the adaptation of the thoroughfares to the new traffic needs.

Transportation, according to Secretary Redfield, is not a unity, but a trinity. The three kinds of transportation are not hostile; but independent, and they must work together.

He pointed out that the motor truck is an example of the development of "the tool for the job," and that it has come to stay. Truck transportation, he believes, is going to develop faster than the providing of roads to take care of it. There will be long through lines and a system of rural motor express routes to get goods to railways and waterways. The problem of the future is to make the three systems of transportation into one harmonious whole.

Secretary Redfield touched briefly upon the period of reconstruction and readjustment to follow the war. There are now, he said, 15,000,000 to 18,000,000 people engaged in munitions making or other war work. All of these have got to be shifted to work of peace. This is going to be one of our most difficult problems, and we should get ready to begin public work to take care of it.

After Secretary Redfield's address, President Blanchard took the chair and spoke briefly, thanking the association for his election and calling attention to the opportunities for the association during the coming year. He outlined briefly the committee work that should be done, laying special emphasis on the labor problem.

Highway Traffic Association of the State of New York

The Highway Traffic Association of the State of New York will hold a conference on "Snow Removal from Trunk Highways" at the Automobile Club of America, 247 W. 54th St., New York, N. Y., on Monday evening, Nov. 11.

The conference will be participated in by representatives from the North Atlantic and North Central States, and among the speakers will be: James I. Blakeslee, Fourth Assistant Postmaster General of the United States; Charles J. Bennett, State Highway Commissioner of Connecticut; George H. Biles, Second Deputy State Highway Commissioner of Pennsylvania; Edwin Duffey, State Commissioner of Highways of New York; Capt. J. A. Duchastel, City Engineer and Manager of Outremont, P. Q.; Peter G. Ten

Eyck, Regional Chairman, Highways Transport Committee, and Henry G. Shirley, Secretary, Highway Industries Association.

The conference will be preceded by an informal dinner in the grill room of the club and by the annual meeting of the association. The dinner will be served at 6:30, at \$1.50 per cover.

PERSONAL MENTION

George Baker, Assistant City Engineer of Dayton, Ohio, has been commissioned a first lieutenant in the Corps of Engineers, U. S. Army.

Lewis C. Duncan, of Westville, N. J., has been appointed a member of the New Jersey State Highway Commission to succeed the late W. F. Gaunt.

E. Paul Ford, formerly city engineer of San Diego, Cal., has been commissioned a first lieutenant and has been assigned to the 403d Engineers at Fort Douglas, Utah.

Peter G. Ten Eyck, of Albany, N. Y., has succeeded George H. Pride, President of the Heavy Haulage Co., New York, N. Y., as regional chairman of the Highways Transport Committee for region No. 2.

E. E. Howard, of the firm of Harrington, Howard & Ash, consulting engineers, Kansas City, Mo., has been commissioned a captain in the Corps of Engineers, U. S. Army, and has been temporarily assigned to duty at Fort Benjamin Harrison.

Charles D. Weirbach, formerly city engineer of Allentown, Penn., has been commissioned a captain in the Quartermaster Corps and has been assigned to duty as assistant to the chief of the Construction Division. Capt. Weirbach had served as city engineer of Allentown for twelve years when he resigned last February to become sanitary engineer on the staff of Admiral Bowles of the Emergency Fleet Corporation.

PUBLICATION

PHILADELPHIA, PA., DEPARTMENT OF PUBLIC WORKS, BUREAU OF STREET CLEANING. Annual report for the year of 1917. Paper, 6x9 in., 26 pages and covers; illustrated.

This report is a concise review of the work of the street cleaning division of the Department of Public Works. Special attention is given to the publicity campaign undertaken by the bureau to secure the cooperation of the public in keeping the city streets clean and free from litter. The report is illustrated by views of equipment and by reproductions of advertisements, posters and other publicity matter and of recording forms used by the bureau.

"HIGHWAY COST KEEPING," by James J. Tobin and A. R. Losh, Engineer Economists, Office of Public Roads and Rural Engineering; reviewed by Halbert P. Gillette, Consulting Cost Engineer. Bulletin No. 660, U. S. Department of Agriculture, dated Sept. 12, 1918. Paper, 6x9 in., 52 pages and covers; illustrated.

There are three main portions of this bulletin, the first dealing with the general aspects of cost keeping, the second with the application of cost keeping to highway work, and the third, the appendix, consisting of tables for use in determining costs and preparing estimates. In the second portion, an elaborate and comprehensive system of accounting is worked out, with code numbers for various road building operations. The text is illustrated by reproductions of a number of cost recording forms.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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Highway Work in Ontario

Canadian Province Makes Progress in War-Time Road Work and in Preparing for Traffic Needs of the Future

Road work in Ontario in 1917 was hindered by the conditions that have held back road work in this country during the war—scarcity of labor, high wages, and transportation difficulties—according to the annual report of the Department of Public Highways, which has recently been issued. The financial conditions have not been entirely unfavorable, especially in the case of rural municipalities, although road work has been largely restricted to that which could be carried on with funds available from current revenue, bond issues having been very limited, both in number and amount. In some localities also, it was impossible to secure the necessary labor for the maintenance of existing roads.

The attitude of the Provincial Highway Department toward road work is plainly set forth in the following extract from Deputy Minister McLean's report:

"Unnecessary labor of all kinds, and unnecessary expenditure should undoubtedly be avoided in time of war, not merely on the part of national and municipal governments, but also by the individual citizen. Acting on this general principle, the Department of Public Highways has not encouraged road construction or expenditure except where dictated by needs of efficiency and economy. It is recognized that the waste of time in transporting goods or in driving over bad roads is very great; that much inefficiency is created by bad roads; and that because of bad roads farm produce is frequently lost or much depreciated by inability to place it on the market. Road construction rightly applied is a useful war measure. Reasons of efficiency in transportation render it expedient that certain roads should be built even in war-time; but more



A CLAY ROAD IN ESSEX COUNTY, ONTARIO, CANADA—SURFACE UNDER CONTINUOUS MAINTENANCE BY DRAGGING

important, that others already improved, should be properly maintained.

"Road maintenance means largely that a limited amount of time and effort are expended on the repair and improvement of roads in order that a comparatively great amount of time and energy may be saved in travel and transportation over them; in order that still other traffic which would have to take less economical routes will follow the improved road; and in order that still other traffic which would not exist, may be created and developed. Good roads, desirable as a matter of efficiency in time of peace, are much more necessary in time of war, when economy of men, money and labor is urgent. While the extensive construction of new roads may not be a saving in man-power within the period of the war, the better maintenance of existing roads is undoubtedly a profitable war measure. The strategy of war is largely a problem in roads; and that principle, rightly understood, extends in some degree to the remote points of production throughout the Empire.

"The efforts of the Department of Public Highways have been energetically devoted to organization for road development after the war, in order that this important public work may be utilized as far as possible in the adjustment of after-the-war problems. To this end surveys are being made for provincial work, municipal organization has been encouraged, and it is anticipated that rapid progress will be made at the close of the war in meeting the needs and opportunities of better roads."

Most of the road mileage of the province is included in two classes, one comprising what are designated as township roads, and the other county roads. In addition, there is a comparatively small mileage included in what are designated as suburban roads, provincial county roads and provincial highways.

The county roads, that is, those included in the county systems, are most important, for, while they comprise only about 20% of the mileage they carry about 80% of the traffic. At the date of the report, what is known as county road organization had been adopted by 36 of the 37 organized counties in the province. Under the terms of the Highway Improvement Act, providing for county organization, a county council may assume for construction and maintenance a system of main market roads, placing the work on them in charge of a county engineer, or superintendent, appointed by the county council and acting under the direct supervision of a committee of that body. Roads assumed in this manner pass from the control of the townships and must be financed by the county by the issuance of bonds, or by the proceeds of tax levies. The system adopted must be approved by the Provincial Highway Department and work must be done in accordance with its regulations. The province aids in the expense of this work to the extent of 40% in construction and 20% in maintenance.

During 1917 the total expenditure on county roads was \$1,388,341.87, of which \$1,006,814.80 was for construction and the balance, \$381,527.07 was for maintenance. The work done included the grading of 104.70 mi. of road, paving with broken stone 70.41 mi., paving with gravel, 79.05 mi., and building 75 bridges and 556 culverts.

Township roads are under the control of townships and are improved and maintained with funds raised by a general levy on the township assessments and by statute labor. The annual expenditure of the townships at present is estimated at \$2,500,000, of which \$1,400,000 is in cash and the balance is in labor.

Suburban roads are highways adjacent to cities, but outside of their limits, that are improved jointly by the city and the county. They are designated upon the initiative of the county council, which must submit the matter to the Department of Public Highways for approval. The department

submits the application to the city and if, taking into consideration the views of the city officials, it decides to grant the application of the county, the roads are designated and placed under the control of a commission made up of representatives selected by the city and the county council. In the case of cities having less than 50,000 population, the commission consists of three persons, one selected by the city, one selected by the county and the two agreeing on the third. In the case of cities having a population of more than 50,000 persons it consists of five persons selected in like manner. For construction work the province contributes 40% of the cost and the county and city 30% each. For maintenance and repair the province contributes 20% of the cost and the county and city 40% each. A section of road designated as "suburban" remains a county road, for which the county is responsible, and the work is done under the direct charge of the county road superintendent, but subject to the instructions of the special commission.

Provincial highways are those roads which are taken over by the provincial government under authority of the Provincial Highway Act of 1917. This law authorizes the Provincial Highways Department, with the approval of the Lieutenant-Governor in Council, to take over any public highway and assume responsibility for its construction and maintenance. The cost of improving roads under this system is borne by the province and the municipalities through which they pass. On roads adjacent to cities the province pays 40% of the cost, the city 30% and the municipality 30%. Outside of suburban sections the province assumes the proportion levied on the city, paying 70%. The remaining 30% is assessed upon the municipality. In the case of bridges the local municipality pays 60% of the cost and the province 40%. In cases where a special type of pavement is desired by residents of a locality, the excess portion of the cost is assessed on a frontage basis. The cost of surveys, machinery, right of way and overhead is borne entirely by the province.

The first section of the provincial highway system was taken over by the department in August, 1917. It is a highway known locally as the Kingston Road, extending from the easterly boundary of York County at the River Rouge to the Town of Port Hope. It is 45.7 mi. in length, but since portions within the incorporated towns of Whitby, Oshawa, Bowmanville and Newcastle are left under the jurisdiction of the local authorities, the length of the road actually assumed by the province is 38.07 mi. A small amount of work had been done on this road on Jan. 1, 1918.

Provincial county roads are roads of more than local importance, but not of sufficient importance to be classed as provincial highways. They are designated by the Provincial Highway Department and remain under county control, but the province contributes 60% of the cost of construction and maintenance. The roads so selected will generally be branches of the provincial highway system.

In 1917 there was a total registration of 83,790 motor vehicles, consisting of 78,861 passenger cars, and 4,929 commercial vehicles. This was an increase of 29,415 over the registration of 1916 and was nearly twice that of 1915. At the date of the report there was one car for each nine people in the province.

It has been proposed, from time to time, according to the report, that all or a part of the revenue obtained by the province from motor vehicle registration be returned to the municipalities from which collected. This subject is discussed at considerable length, as follows:

"The registration of motor cars is necessarily a function of the Provincial Government, since, for purposes of law enforcement, it is essential that all cars be registered in a central department. The province thus relieves municipalities

(Continued on page 191)

GOOD ROADS

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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HIGHWAY MAIL SERVICE

Proposals, which, if carried out, would have a far-reaching effect upon road improvement—that, in fact, might give such work a greater impetus than it has already received as a result of war-time demands on transportation—were set forth in detail by James I. Blakslee, Fourth Assistant Postmaster General, at the meeting of the Highway Traffic Association last Monday evening.

His address, printed on other pages of this issue, should be of much more than passing interest to road builders and all who are interested in highway work.

Considerable progress has already been made in the utilization of the highways for carrying mail. The Post Office Department has gone about it quietly, however, and what has been accomplished is not generally realized. But what has been done so far is insignificant when compared with what is planned for the future.

Briefly stated, the Post Office Department proposes to utilize in highway mail service not only the available military equipment, but also the available military personnel, and, further, to use a part of the earnings of that service for the construction and maintenance of the roads used.

So great an extension of the mail service over the country's highways must necessarily result in a very great stimulation of road betterment work. Trucks mean roads, and the plan to build those roads with the earnings of the trucks offers a logical solution of the problem of providing them. The roads of the country are the property of the people, and the post office system exists only for the people. If it earns a profit, that profit should be turned back to the people, and it can benefit them in no other way so greatly as in the improvements of the highway system.

While excellent in its broad aspects, the plan should be most carefully worked out in its details. The Federal Government is not less fallible than a state or county government and should not undertake any work of such importance as that outlined except under every safeguard that can be erected by law. In fact, it is an open question how far federal control should extend in actual construction and

maintenance—whether the central government should do more than exercise a very broad and general supervision.

The matter is a public one, and ought to be brought before the people. Road builders, especially, should take the liveliest interest in it, and should use all the influence they possess in the formulation of detailed plans.

BOND ISSUES FOR ILLINOIS AND PENNSYLVANIA

The people of Illinois and Pennsylvania are to be congratulated upon the results of the election on November 5 by which each state is assured of an ample fund for road improvement.

In Pennsylvania, where a \$50,000,000 issue was authorized, the proposition encountered determined opposition from the State Grange. Five years ago that organization defeated a similar proposition, and the vote on the 5th is a very heartening evidence of the change that has come about in public opinion. It is fitting too, that Governor-elect Sproul has been chosen to head the administration that will begin work under the issue, for his leadership has been a great factor in the progress Pennsylvania has made in road work.

Little opposition to the Illinois bond issue of \$60,000,000 was evident before the election. The plan had been kept before the people in an unusually thorough and determined campaign, and there was little doubt of the result.

Both states have made provisions for financing road improvement programs that should go far towards putting them in the front rank of progress. In neither state can a start be made too soon.

WHAT ABOUT THE HIGHWAYS?

Since last week's issue came from the press Germany has accepted the Allies' terms of an armistice and hostilities have ceased. Though, technically the war isn't over and peace may not be declared for months, the beginning of the end has come, and readjustment to peace conditions has actually commenced in this country.

What about the highways?

A year and a half of war was not enough, apparently, to bring the authorities of this country to a full realization of the vital necessity of roads in war time. The need of roads in peace is better understood, even now, and in the not far distant future, unless present signs fail, its recognition will be much wider.

One effect of the war upon America seems plain; there will be unprecedented demands upon agriculture, commerce and industry. The United States will have to bear a large part of the burden of supplying the world with food, raw materials and manufactured products.

This means great activity here and a heavy demand upon transportation—railway, waterway and highway.

Because of conditions that have been discussed in these columns many times in the past eighteen months, the highways will be called upon to play a larger and larger part in caring for this traffic.

It is reasonable, therefore, to look forward to a great era of road building, and that expectation is general among those in closest touch with the various factors in the situation.

Snow Removal on Trunk Line Highways*

By CHARLES J. BENNETT†

I can remember with pleasure, when a boy, the expectancy with which everyone looked forward to the arrival of snow. In those days, it was a signal for good times of all kinds, and no thought was given to the idea that traffic might be hindered or the ordinary business of life stopped.

As the years passed, snow, however, became more and more a nuisance, as in the large cities it was necessary to remove it on account of the increased travel; and today, we have arrived at the period when it is necessary to consider the removal of snow from highways of great length in order that the traffic which has developed may be accommodated.

Two things are evident: First that the snow must be removed; second, that it must be removed by the agency responsible for the condition of the highways.

In consideration of the first idea we know that the traffic has developed to such a point as to demand continuous service on main travelled motor routes for twelve months in the year. This fact cannot be evaded. The motor is here; it has its place in our national life and in order that it may give us efficient and maximum service such service must be continuous. The establishment of rural routes, the utilization of trucks and passenger motors command the attention of highway engineers, and the snow removal problem becomes a vital issue to be solved at once and successfully. This is not a war problem but an activity that has come to stay.

On the second statement, namely, that the state highway department must perform the work, it must be admitted that the work will never be properly done if left to the ordinary county or town agencies. The results would be of different standards and in many cases reached tardily or not at all. Then, too, the fees for motor licenses are almost invariably turned over to the various highway departments for highway maintenance and as inferred above this work is recognized as a vital part of our maintenance problem. Add to this the fact that intelligent snow removal results in a decrease in cost of repairs in the spring and we may write "Q. E. D." after our two propositions.

A study of the subject reveals several fundamental principles which should be recognized:

First, that different sections of the country require different methods and degrees of snow removal.

Second, that the methods devised should take into consideration the character of traffic and the number of vehicles of different classes to be accommodated.

Third, that the methods to be devised will depend entirely on the degree of removal required. For example, in the northern states where heavy snowfalls occur, it is not necessary to consider at the present time any system of snow removal which will allow the passage of trucks, because there are few trucks which need to be operated in these sections. The amount of snow to be removed is so great as to make the cost of the work prohibitive.

On the other hand, in the Atlantic tier of states where at times the snowfall is heavy, it becomes necessary to remove the snow so as to allow the passage of motor trucks, because these trucks are numerous and important to commercial activities. The universal use of other motor vehicles for business or pleasure purposes demands the removal of

snow so that people may go about their ordinary pursuits by motor, even in the winter time.

The method of breaking our highways or for the removal of snow will depend, as noted above, on the character of traffic to be accommodated.

Again, certain fundamentals should be taken into consideration in devising a system of snow removal.

The problem of the trunk highway differs from the problem of the city street, since the area to be organized is so large that no one person can comprehend the amount and character of the work to be done or personally supervise the removal of any given snowfall.

Evidently snow can be more easily disposed on country roads than in the city streets.

Owing also to the necessity for promptness of action, a system must be devised which will go into effect immediately upon the appearance of snow and result in the prompt removal of the necessary amount of snow, such removal to be completed within a reasonably short time after the storm and to such degree as will permit of the passage of the preponderant class of traffic. The necessary equipment for the purpose must be provided and located at convenient points so that it can go into prompt action, in many cases without notice from headquarters.

Unnecessary work may often be done, but it must be recognized that this work is emergency work and the benefits in many cases are negative.

During certain storms the telephone system is either seriously hampered or entirely put out of commission. Consequently a system of snow removal to be effective should be independent of the telephone, and the men having the operations in charge should be drilled in their duties sufficiently in advance so that they will know what is to be done and proceed with the work without delay on the arrival of a snowfall which is in excess of 3 in.

The hours of labor should not be restricted, and the time of starting should be early enough so that the forces can get the best of the storm and always keep slightly ahead of it. For instance, it has been my experience in several cases where the department has not taken prompt steps to remove the snow as it fell that traffic was seriously hindered on account of this delay, and in some instances the satisfactory removal was deferred for several days after the occurrence of the storm.

The organization for this work should be elastic; the foremen or supervisors having the work in charge should have a free hand to employ the necessary men and teams to take care of an abnormal snowfall. A definite district should be allotted to each foreman, or sub-foreman, so that too much work will not rest upon one man. It is remarkable to note what an immense amount of work can be done with snow for a small amount of money, providing the work is undertaken promptly and under a systematic plan. Arrangements should be made so that the employees detailed for this work will report at headquarters as soon as a snow storm commences and remain on duty until the work is done or is shown to be unnecessary.

One of the difficulties in removing snow is that the special equipment is in many instances not suitable for other purposes, so that an endeavor should be made to adapt the ordinary road making or maintaining machinery to the purpose of snow removal. This has been done successfully in many instances, particularly in the devising of scrapers or plows to be fixed to the front of motor trucks for the pur-

*Paper presented at the conference on "Snow Removal from Trunk Highways," under the auspices of the National Highway Traffic Association, Automobile Club of America, New York, N. Y., Nov. 11, 1918.

†State Highway Commissioner of Connecticut.

pose of removing snow from highway surfaces. These trucks are successfully operated in cases where the wheels can secure a firm grip on the road surface, but are not satisfactory in operation where the snow is allowed to drift or to accumulate to a depth in excess of 6 in., which is again an argument for promptness of action.

Work should start on a continuing storm when the snow is 3 in. in depth.

Road machines may be used either drawn by horses or attached to the rear of a truck and hauled through the snow. The difficulty with road machines is the same as in the case of motor trucks—the wheels must have a bearing on the road surface in order to allow the work to be done successfully. As a matter of fact, much of the snow removal work must be done and is done using draft animals and makeshift apparatus. This applies especially to those highways where drifted snow is to be removed in order that wheel traffic may be accommodated, the first operation consisting of running a team or several teams attached to a bob sleigh over the road. Attached to this bob sleigh should be some form of plow which will break out the snow on the surface of the road, and allow a more efficient type of machine to be handled by motor truck or tractor.

In cases of highways where it is necessary to provide for the passage of horse-drawn vehicles on runners, the use of snow rollers is advisable. These snow rollers consist of heavy wooden rollers drawn by horses or oxen. The rollers compact the snow so that the travel can pass over the top. There is no practical use for this method where trucks are to be used.

The main problem before the maintenance engineers of today is, however, the removal of snow on highways to

accommodate truck traffic, and the points mentioned above should be re-emphasized; namely, promptness of action to a specified plan which should go into effect without notice if the telephone fails; lack of attention on the part of the help to hours of labor or the time of day when the work is to be done; and continued service until the trouble has passed.

As to the cost: In Connecticut with an unusual winter the total cost of snow removal for 1917-18 was approximately \$50,000 for 1,000 mi. of highway cleared with varying degrees of excellence and of varying depths of snow. In general, for work of this character in this section of the country, an estimate of \$45 per mile per year should be made where two lines of truck traffic are to be accommodated and the snow removed promptly.

In this work, advantage should be taken of the Weather Bureau. My experience has been that these reports are of value though at times they miss local storms and in some instances fail to predict serious snowfall. We are all relieved when a prediction of serious snowfall results in rain, or in no precipitation. In general, this bureau is an aid but not an entire reliance.

In conclusion, when all plans are made the chief officer of the organization should watch the weather and be sure that all his assistants are alert and on the job.

As a result of some years of experience in city and state work, I can say that snow removal work is the cause of much criticism and results in many disheartening failures. Here, above all, we have to admit that "eternal vigilance is the price of safety."

And after the snow is removed and traffic is accommodated, look out for the waterways.

Development of the Motor Truck Parcel Post After the War*

By JAMES I. BLAKSLEE†

The victorious veteran is with us. Parades and public demonstrations, enthusiasm and red fire will greet him everywhere. Fervid oratory, heartfelt gratitude and every symptom of public appreciation will be in evidence. This will, no doubt, be gratifying to him; this exhibition of popular acclaim and approval will impress him, and indirectly arouse intense patriotic feeling throughout the country.

Now, let us do more for him. Let us, in a practical manner, give him substantial return, not only in lip service, but in concrete fashion. Let us guarantee him useful employment of a constructive character necessary to the advancement and welfare of the nation, so that he may maintain his self-respect; so that there will be no question of his future. While the problem of demobilization of military and industrial activity confronts us, let us promulgate a program of constructive development that will benefit not only the veteran, but all the people—not temporarily but permanently.

Therefore, I propose that we use the available military equipment, and such available military personnel, in the construction and operation of a governmental enterprise that will be immediately profitable, and which, in turn, will produce sufficient revenue to continue its administration and operation in an orderly and proper manner.

I am informed that there are 100,000 motor vehicles now

in use, or in process of construction for military purposes. I am certain that a vast number, if not the majority of this surplus equipment, can be utilized in the transportation of merchandise and commodities through territory within the country that is not immediately adjacent to existing means of transportation, and is situated in productive localities where inadequate means of conveyance obtain. To properly utilize such an enormous number of moving units would require the service of an equally huge army of individuals, and thereby provide employment for thousands of men who have been making a sacrifice for us all.

I am firmly convinced that the extended use of this surplus military motor-vehicle equipment will quickly demonstrate the necessity for the permanent construction and improvement of highways that will be useful not only for military purposes, but for the transportation of merchandise, commodities and farm produce, and I submit that in the construction, maintenance and repair of the roads over which these transportation facilities may be operated will be required thousands and thousands of able-bodied men now enlisted in the army but who will be forthwith available to perform this work of construction.

Team work is essential to the success of any program. It is especially vital to the success of any program that includes the construction, improvement or maintenance of the public highways, that definite, specific plans shall be formulated, and that all individuals or organizations interested in the promotion of the program shall cooperate enthusiastically without the slightest jealousy, and without the least

*Address at the conference on "Snow Removal from Trunk Highways" under the auspices of the National Highway Traffic Association, Automobile Club of America, New York, N. Y., Nov. 11, 1918.

†Fourth Assistant Postmaster General of the United States.

attempt to raise technical questions that would in anywise interfere with the successful culmination of the program. Whatever proposition is presented to the public for the improvement of a highway will meet with enthusiastic approval for a period. Everybody is for it. But, in a short time, someone here or some organization there, inquires into the details of the proposition, and, because it does not contain a particular feature suggested by such person or organization, or because it does provide for a route of travel that is not immediately adjacent to the locality that such person or organization thinks it should, forthwith proceeds to obstruct or defeat the proposition as a whole.

One of the greatest difficulties that confront the advocates of good roads in this country is the cost of construction and payment therefor. I have participated in numerous movements for the betterment of highways. I have heard splendid orations about how to build a road, but I have failed to note any concrete declaration of a satisfactory method of raising funds to pay for the construction of good roads, or to meet the expenses of the improvement and maintenance thereof, except through the use of federal or local taxes. Forthwith dissension arises. For, whenever the general public is expected to pay for the construction of a particular highway, travelling through territory remote from the domicile of the taxpayer, the larger the taxpayer the less enthusiasm is evidenced, for he feels that he is not receiving adequate direct returns from the investment that he has made in the highway.

I have, before this time, proposed that the greater portion of the cost of construction and improvement of permanent highways should be borne by those who used them, and I have endeavored to illustrate how, through the increased use of the highways by the Federal Government in a profitable enterprise, this cost of construction and expense of improvement and maintenance could be defrayed. I again present the proposition to you in a form that I trust will be easily understood.

I believe that there should be three different methods of meeting the cost of the construction and improvement of highways.

First: For a highway entirely federal or national in character.—The Federal Government should defray the cost of construction, improvement and maintenance thereof as an interstate highway, available not only for the transportation of merchandise and food products, but also useful for military purposes, and this main line or through connecting national highway should be utilized by the Federal Government in the transportation of commodities upon which a revenue should be earned sufficient to meet the expenses of transportation, and to provide for the improvement and maintenance of the roadway over which the commodities are conveyed. And I submit a definite, specific method, one that we have tried and found profitable—the conveyance of mailable matter, including parcel post, at regular postage rates which are, at this time, sufficient to cover the cost of transportation, expense of administration, and the construction, improvement and maintenance of the highway used for such purpose.

There are today transportation facilities in daily operation on through or connecting highways from Portland, Ore., to Richmond, Va.; from New York City to Chicago; from Indianapolis, Ind., to Montgomery, Ala., and with an appropriation of \$300,000 the postage revenues on these highways and adjacent roads leading to the same, now average over \$2,000,000 per annum.

This concrete exhibition of the coordination of a governmental function such as the mail service with good roads, is a more sufficient warrant for the encouragement of the greater extension of this program than for any other that has as yet been presented, and leads to the second method.

Second: For a highway supported by the Federal Govern-

ment and the states and local subdivisions thereof.—This method, one of cooperation in the improvement of highways on a basis that is in effect at this time, is one whereby the Federal Government participates with the states and local subdivisions thereof in the cost of construction and maintenance of highways, by paying one-half the cost thereof, and such expenditures should be made with due regard to the value of the highway in its relation to the trunk line, or national highway, heretofore mentioned. These highways should be known as feeder highways and located near trunk lines, or national highways, within producing territory, so that when mail facilities or other transportation functions may be established thereon, the revenues therefrom may be used to assist in defraying the expenses of construction, improvement or maintenance.

Third: For a highway supported by state, county or township.—This third definite suggestion includes the construction and maintenance of the dirt or gravel roads, which should be borne by the local state, county or township, and would be utilized as supply roads to the feeder roads that finally connect with the national trunk line roads. These supply roads would, naturally, be used exactly as they are used today, mail facilities together with other means of transportation travelling over the same, collecting commodities from the outlying sparsely settled sections for transmission to feeder roads and thence to the through national highway to the larger urban centers that consume the products.

Now, in this proposition, I simply endeavor to illustrate, or to present to you, a definite, specific program of highway construction and maintenance and a definite, specific method of defraying the cost of the same.

There may be other methods that are improvements on this, or present a better or more desirable system, but until some such improved plans are forthcoming, it seems to me that the hearty cooperation and unanimous assistance of all those who are interested directly or indirectly in good roads should be devoted to the promulgation of this program.

I shall concede to the conscientious objector that there are many points where this proposition may be attacked. I shall acknowledge that all the revenues derived as stated are not to be credited exclusively to the particular service now in operation; that the matter transported could travel by other means of conveyance—perhaps not so efficiently or safely, but none the less travel. However, 50% is at least a fair proportion of such revenues, and, even there, I know of few enterprises that upon an investment of \$300,000 would be able to produce an annual income of \$1,000,000, which is 50% of the whole income derived from this investment of \$300,000.

The benefits of the adoption of such a system of highway construction and improvement are not confined to the enlarged revenues of the Government or the betterment of the roads alone; there is a still greater interest than either involved, and that is the convenience of the people. It is the value of the service performed. The benefits can be extended to include the cost of living, for, through the complete organization of a system of transportation facilities covering improved roads, commodity prices that have today reached exorbitant figures, can be influenced to a considerable extent, for, having established through or connecting roads as previously stated, it was our duty to, ascertain in what manner such service could be utilized to better advantage of the patron than simply the direct transportation of merchandise, and, in order to do so, we collected retail prices of provisions and produce of several different classes at the 300 or more post offices located on or adjacent to the truck routes, and we found that on Oct. 22, 1918, fresh eggs were selling in the city of Newark, N. J.—11 mi. from here—at \$1.00 per dozen, when a tremendous supply was available at New Holland, Penn., a distance of 100 mi. from

Newark, at 60 ct. per dozen. With a postal rate of about 3 ct. per dozen, this indicated that if we had been able to provide adequate direct mail facilities from New Holland, Penn., to Newark, N. J., we could have possibly delivered this prime food product in that city at from 25 to 30 ct. per dozen less than the price the citizens were paying. And the price obtained at New Holland was not the lowest price that prevailed at numerous other localities on the direct lines operating from Newark.

Consequently when a complete system, properly equipped, is in operation, the revenues of the Government will be increased and the cost of the construction and improvement of the highways will be defrayed.

But a far more desirable result will have been attained, and that is we shall have supplied to the merchants in the city a means of conveyance for the merchandise to the producer in the country, and shall have provided the residents in the city with a means of securing their produce at greatly reduced prices direct from the farmer.

Highway Work in Ontario

(Continued from page 186)

from the responsibility and expense of registration; and the registration fees are primarily indicated as a source of provincial revenue. Municipalities receive all fines imposed, through their constables, under the Motor Vehicle Act.

"The fees for motor car registration were advanced in 1916, in order that a substantial provincial fund would be created for road improvement. Motorists were informed when this increase was made that the purpose was to provide for road betterment. It is, therefore, incumbent upon the provincial authorities to see that this money is applied to substantial road improvement and is not spent inefficiently or merely returned to local municipalities to enable them to reduce the local tax rate.

"The road laws providing provincial aid to road construction have been placed by the government on their present broad and effective basis, in the belief that revenue from motor vehicle licenses would form a permanent fund for provincial cooperation in road improvement. If this revenue is to be lessened, provincial expenditure on roads will necessarily be decreased, or placed on a less sound financial basis, to the public detriment.

"It is characteristic of the motor car that its use is not confined to the municipality in which it is owned. The result is that cars owned in the cities of the province are used freely on all rural roads; and the demand for the improvement of rural roads is as urgent from the cities as it is from the townships.

"If motor car fees were returned to the municipality in which the car is owned, monies received from city-owned cars would also be returned to cities, instead of becoming available for use on main country roads, the improvement of which, as previously stated, is largely urged by residents of the cities.

"Cities should contribute to the construction of main roads. This has been done, directly or indirectly, by every country which has built up an adequate system of leading roads. In no other way can it be accomplished in the Province of Ontario. The expenditure of motor vehicle fees on rural roads is but a small levy upon cities for this purpose, and is still far from meeting the obligation of cities to this work. To return motor vehicle fees to the cities would be to still further weaken the needs of municipal organization of Ontario in a particular in which it is already defective, viz., the municipal separation of cities from the township and county in which they are located.

"Under the existing highway laws of Ontario, the fund collected from automobile registration is now largely the basis of provincial grants for roads purposes, and it is

returned to municipalities for expenditure on county roads under the Highway Improvement Act; or is spent in other ways on main roads in the open country which are subjected to heavy motor traffic, and which the local municipalities could not be expected to maintain. Thus motorists contribute directly to the improvement of the roads they wear out.

"County roads are merely the leading township roads; and they are not of less service to township ratepayers because they are under the control of county councils. The provincial aid given to roads is, therefore, a method of giving the best and most effective form of aid to township roads.

"The great need of Ontario has been, and still is, the greater concentration of funds in road construction. Past inefficiency in road management throughout the province, which permitted the roads to remain in an inferior condition, has been largely due to the policy of scattered expenditure followed by township councils. Under township management, coupled with statute labor, practically no roads were 'built.' They were merely carried along from year to year by a method of patchwork, which produced no permanent results. A continuous mile of good road, except under favorable conditions of drainage and materials, was the exception, not the rule.

"Expenditure was made in small amounts, with the object of making the greatest temporary showing. The roads lacked foundation and body to support traffic under wet conditions of autumn and spring, and 'broke up' annually. Expenditure which does not produce roads that will not 'break up' during the wet season, is, as a rule, wasteful. One rope that will sustain a weight is infinitely more economical than innumerable threads that are broken as often as the weight can be attached.

"'In union there is strength' is a truism in its application to concentrated expenditure on roads. One road with 12 in. of metal which will not break up, is vastly more economical than a dozen roads with 4 in. of metal, but which break up annually and are never in good condition.

"Briefly, roads must be built in proportion to the traffic over them. Roads of heaviest traffic are those radiating from market towns and shipping points, and included in county road systems; or roads joining up leading cities with the international and interprovincial boundaries, and to be classed as provincial highways. These are the roads of concentrated motor traffic, the roads which are most expensive to build and maintain, the roads which local municipalities are unable to keep in repair; nor is it equitable that they should do so. These are the roads to which motor vehicle revenue should and is being directed under the existing highway laws of the province.

"Any system which results in the diffusion of this revenue on roads of minor importance would defeat a fundamental need of existing conditions in the province."

Operators of Automobiles in the Canal Zone must have licenses hereafter, an executive order to that effect having been issued last month. Under a law authorizing the president to "make rules and regulations affecting health, sanitation, quarantine, taxation, public roads, self-propelled vehicles, and police powers on the Canal Zone, and for other purposes, including provisions as to certain fees, money orders and interest deposits," the order provides for the examination of applicants for operators' licenses and a fee of one dollar. Operators must be at least 18 years old, of sober habits and able to read "either the English or Spanish language."

Government Lifts Ban on Highway Work

War Industries Board Modifies Restrictions on "Non-War" Construction and Manufacturing

The War Industries Board, according to recent advices from Washington, has announced extensive modifications of the restrictions against construction and manufacturing classed as "non-war" work.

All restrictions on the improvement and development of highways by federal, state or municipal authorities are removed, according to the report, and all industries that have been curtailed as a war measure may increase their output by 50% of the curtailment imposed by previous orders.

Among the manufactures affected are all kinds of road machinery, passenger automobiles, and pneumatic tires.

Proposed Viaduct Between Boroughs of Queens and Brooklyn, New York City

Better Facilities for Traffic Between Important Sections of the Greater City Urged by Business Men

The business men of the Long Island City section of the Borough of Queens and of the Greenpoint section of the Borough of Brooklyn, New York City, have joined in a request for the improvement of traffic ways between these two important industrial sections.

At present the only connecting link is the Vernon Avenue viaduct over Newtown Creek. This has become one of the busiest routes of traffic in the city, a total of 10,000 trucks and automobiles passing over the structure daily, according to reports.

A request for the improvement of this viaduct and for a study looking to the construction of another viaduct has been filed with Commissioner John J. Delaney of the Department of Plants and Structures.

Shipping Board Head Advocates Highway Improvement

Chairman Hurley Urges Upon Highways Transport Committee the Stimulation of Highway Transportation

The necessity of stimulating highway transportation to take care of the shipment of food and other supplies has been urged by Chairman Edward M. Hurley of the United States Shipping Board in a recent letter to the Highways Transport Committee of the Council of National Defense. Chairman Hurley's letter follows:

"Our merchant marine of today and tomorrow will carry a message of good will to the nations of the world.

"Millions of cruelly starved folk face westward from every shore with mouths open to the promise of America. These must be fed, and then clothed, and also supplied with the other necessities of life. Our grand privilege is now here to restore life, strength and hope to these martyred brothers of a hundred tongues.

"Highways transport facilities at the farmer's gate and at every farmer's gate, must immediately suggest the initial phase of overseas distribution; must make a picture in the farmer's mind of the movement of the products of his soil and labor from his own gate through to the distant points of the world—to Europe, to Algiers, to Athens, and the Orient.

"The highways transport service is the first step in the great system of transportation to the sea and then on the merchant marine to the far points of the world.

"Food must begin to move soon from every hill, through every valley of the great country behind our shores, down to the shipping points before we can start our ships from the ports and fulfill our duty; and with the promise of the war's end before us, the Highways Transport Committee throughout this land could and should render a peace-time service by stimulating highways transport of nourishment and supplies so badly needed. Routes and channels from shipping points must be opened up and efficiently maintained, and our merchant marine must be built up to meet the demands for distribution overseas.

"Resistance in any form to the free movement of farm products must be reduced and eliminated, and the most efficient utilization of man power must be introduced wherever possible.

"The United States Shipping Board urges that this message be carried through you and your regional chairmen to the state organizations and on down through your great body of patriotic men whose vision can well embrace the crying need of their brothers in other lands for help."

Two States Vote Bonds

Issues of \$60,000,000 and \$50,000,000 Authorized in Illinois and Pennsylvania

Both Illinois and Pennsylvania voted to issue bonds for road improvement at the election on Nov. 5. In Illinois \$60,000,000 was authorized, and in Pennsylvania \$50,000,000.

The Illinois issue has been the subject of a long and strenuous campaign carried on by the Illinois Highway Improvement Association and other organizations. It had the indorsement of many powerful organizations, and encountered little opposition.

Quite different conditions obtained in Pennsylvania, where the State Grange came out strong in opposition, and hoped, if not expected, to defeat the proposition as it did five years ago.

The County Road Commission of Ottawa County, Michigan, has been granted an appropriation of \$94,000 for road work, by the board of supervisors. Of this total, \$23,000 will be used for concrete work on the Central Michigan Pike, \$44,000 for 3 mi. of concrete road between Agnew and West Olive, and \$23,000 for concrete paving on the Dixie Highway in Tallmadge, Polkton and Spring Lake townships.

The County Road Commission of Kent County, Michigan, has nearly \$500,000 at its disposal for new road work and maintenance next year. This sum will be composed of about \$111,000 from a tax for new work, about \$25,000 from a tax for maintenance, about \$70,000 from state automobile fees, about \$60,000 in state rewards, about \$33,000 from funds on hand, and about \$150,000 to be received under the Covert act.

Payments on Federal Aid Post Road Projects from January, 1918, to Sept. 30, amounted to \$852,943.84, or less than one-thirtieth the amount which theoretically could have been paid in that period, according to a statement from the U. S. Department of Agriculture. This is cited as an example of how the "war-time policy of restricting highway construction to projects of military or great economic importance" has been enforced. During the period from July 11, 1916, when the Federal Aid Act became effective, to Oct. 1, 1918, a total of 691 projects were approved by the Secretary of Agriculture. These projects involved the construction of 7,377.83 mi. of road at a total cost of \$52,673,898.74, of which \$19,843,315.02 represented federal aid funds.

MEETINGS

Calendar of Coming Meetings

Nov. 21-22.—Washington State Good Roads Association.—Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Dec. 9-13.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Dec. 11-13.—Highway Industries Association.—Convention, Chicago, Ill. Secretary, Henry G. Shirley, 302 Maryland Building, Washington, D. C.

Feb. 25-28, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

American Road Builders' Association

At a meeting of the board of directors of the American Road Builders' Association held at the Automobile Club of America on Monday, Nov. 11, several changes in the by-laws were considered, and a new executive committee was appointed for the coming year.

One of the changes in the by-laws provides for the increase of the executive committee from three to five and the inclusion of the president of the association as well as the secretary as an ex-officio member.

The new committee consists of President Arthur H. Blanchard; Secretary E. L. Powers; Nelson P. Lewis, Chief Engineer of the Board of Estimate and Apportionment of New York City; Lieut.-Col. William D. Uhler, formerly Chief Engineer of the Pennsylvania State Highway Department, and William R. Smith, President of the Lane Construction Corporation.

National Highway Traffic Association

A conference on the topic "Snow Removal from Trunk Highways" was held by the Highway Traffic Association at the Automobile Club of America, New York, N. Y., on Monday evening, Nov. 11. The conference was preceded by an informal dinner and by the annual meeting of the association.

President Arthur H. Blanchard presided, and addresses were made by Jas. I. Blakslee, Fourth Assistant Postmaster General of the United States; Chas. J. Bennett, State Highway Commissioner of Connecticut; Geo. H. Biles, Second Deputy State Highway Commissioner of Pennsylvania; Peter G. Ten Eyck, Regional Chairman of the Highways Transport Committee; Raymond Beck, Field Engineer of the Highways Transport Committee; and Col. Wm. D. Sohler, Chairman of the Massachusetts Highway Commission. A paper by Edwin Duffey, State Commissioner of Highways of New York, was read by First Deputy Commissioner H. E. Breed, and a paper prepared by Capt. J. A. Duchastel, City Engineer and Manager of Outremont, P. Q., was read by title. There was also some general discussion, especially on the paper by Deputy Commissioner Biles.

The addresses of Mr. Blakslee and Commissioner Bennett are printed elsewhere in this issue; other papers will appear in later issues.

The principal business taken up at the annual meeting was the adoption of a new constitution and by-laws, changing the name of the association to the National Highway Traffic Association, and making considerable modifications in its method of organization and the scope of its work.

The object of the organization, as stated in the constitution, is the "advancement of the efficiency and regulation of highway traffic." The membership is to consist of all persons interested in the object of the organization, and is divided into three classes, active, sustaining and contributing members, only the latter two paying dues. The officers are to be: a president; five vice presidents, one chosen from each of the conventional divisions of the United States, as defined in the by-laws; a secretary, a treasurer, and a director from each state and territory of the United States.

These officers with the five latest living past presidents are to comprise a board of directors.

The revised constitution, and the new by-laws were adopted by vote of the organization, in accordance with the following resolution:

That the constitution and by-laws of the National Highway Traffic Association, as recommended for adoption by the executive committee of the Highway Traffic Association of the State of New York, be adopted as a substitute for the present constitution and by-laws of the Highway Traffic Association of the State of New York with the following provisions:

First, that the sections pertaining to officers shall not go into effect until the annual meeting in May, 1919, and that the present president, vice president, secretary, treasurer and executive committee hold office until the annual meeting in May, 1919; and that the executive committee perform the duties assigned to the executive committee and the board of directors by the proposed constitution and by-laws.

Second, that the assets and liabilities of the Highway Traffic Association of the State of New York be assigned to the National Highway Traffic Association.

Third, that the National Highway Traffic Association be incorporated, the present officers to be the incorporators thereof.

The present officers of the organization are as follows: Honorary President, William P. Eno; President, Arthur H. Blanchard; Vice President, David Beecroft; Secretary, Elmer Thompson; Treasurer, Geo. H. Pride.

PUBLICATIONS

ST. LOUIS, MISSOURI; CITY PLAN COMMISSION. Annual report, for the year 1917-18. Paper, 6x9 in., 8 pages and covers; illustrated.

This is a very brief summary of the operations of the commission during the fiscal year of 1917-18. It is printed on paper of excellent quality and contains two half-tone reproductions of photographs of street work.

AMERICAN WOOD PRESERVERS' ASSOCIATION. Report of the proceedings of the 14th annual meeting, 1918. Paper, 6x9 in., 262+xxxvi pages; illustrated.

Besides the proceedings of the 14th annual meeting of the organization, held at Chicago, Ill., Jan. 22-24, 1918, this report includes the text of the association's constitution, a list of past and present officers, a list of past meetings, a list of members and several pages of statistical data. A considerable portion of the report is devoted to wood block paving, among the matters of this kind being: The report of the committee on wood block paving; specifications for the "pitch paint coat method of construction for street pavement work"; a report on service tests of wood block paving in Spokane, Wash., and in Great Falls, Missoula, Billings and Butte, Mont.; and a paper by C. H. Teesdale on "Condition of Creosoted Wood Block Pavements in Mobile, Ala., Shreveport, La., and a Number of Texas Cities."

PERSONAL MENTION

Charles Folsom has resigned as county road engineer of Christian County, Kentucky, to enter the employ of the Government.

John G. Lavery has resigned as city engineer of Summit, N. J., to enter the employ of the United States Housing Corporation.

Paul E. Ford, formerly city engineer of East San Diego, Cal., has been commissioned a first lieutenant and assigned to the 403d Engineers.

Frank D. Gore, formerly county engineer of Kitsap County, Washington, is now in the aviation service as an instructor, with the rank of lieutenant.

Carl Smith has resigned as engineer of the county road commission of Kewanee County, Michigan, to enter the employ of the Ingersoll-Rand Co.

R. E. Pierce, an engineer of the California State Highway Commission, has been commissioned a first lieutenant and has been assigned to the 403d Engineers.

Clarence S. Jarvis has been commissioned a captain and assigned to the 403d Engineers. Mr. Jarvis has been office engineer of the State Road Commission of Utah for the past year.

A. H. Kindrick, formerly city engineer of McAlester, Okla., has resigned to accept a position as supervising engineer for Burns & McDonnell on sewage disposal construction at Okmulgee.

P. F. Patten has been made highway engineer of Spartanburg County, South Carolina, succeeding Reid Tull, whose death was noted in this column on Nov. 2. Mr. Patten was formerly highway engineer for Greenville and Henderson Counties.

William C. Beyer has been elected assistant director of the Bureau of Municipal Research, Philadelphia, Pa. Mr. Beyer is serving as acting director during the absence of Director Gruenberg, who is connected with the United States Shipping Board.

W. M. Lee, formerly county engineer of Winnishiek County, Iowa, has been appointed a district engineer of the State Highway Commission to succeed H. L. Phelps, now in the service. Mr. Lee will have charge of the sixth district of the state, with headquarters at Cedar Rapids.

W. A. Wynn, Engineer of the Bureau of Township Highways of the Pennsylvania State Highway Department, has resigned, and will conduct the engineering work for an organization of oil companies in the Texas fields. Mr. Wynn has been connected with the Pennsylvania department for nearly fourteen years, five of which he has spent with the Bureau of Township Highways which he helped to organize. He was born at Derry Station, Pa., and graduated from high school in that place and from the Indiana State Normal School. After teaching school for several years he entered the employ of the Pennsylvania Railroad, and later spent a term at the Pennsylvania State College. He graduated from Allegheny College in 1905, after having spent his summers in engineering work, and entered the employ of the department as chief of party. He was appointed an assistant engineer in 1907, and in 1913 was transferred to Harrisburg as engineer of the Bureau of Township Highways which had just been created.

W. B. Rigby has been appointed county engineer of Jackson County, Iowa.

Charles M. Fisher has resigned as county engineer of Jackson County, Iowa.

W. H. Steiner, City Engineer of Marshalltown, Iowa, has been commissioned a first lieutenant of engineers.

P. C. Harris, Assistant State Road Engineer of Utah, has been commissioned a lieutenant in an engineer regiment.

George Baker, Assistant City Engineer of Dayton, Ohio, has been commissioned a first lieutenant in the Engineer Corps.

T. J. Wasser, County Engineer of Hudson County, N. J., has been appointed a member of the executive section of the Highways Transport Committee, and has been assigned to the work of keeping open the New Jersey section of the Buffalo-Baltimore Army route during the coming winter.

R. C. Barnett, M. Am. Soc. C. E., has become economic engineer for the Highways Transport Committee of the Missouri Council of Defense, with headquarters at Jefferson City. Mr. Barnett, who until recently has been an engineer with the Missouri State Highway Commission, has written a number of articles on the economics of highway engineering which have appeared in "Good Roads."

OBITUARIES

C. B. Taylor, formerly deputy city engineer of Utica, N. Y., died recently.

Patrick Cullen, Commissioner of Public Works of Oswego, N. Y., died on October 30, at the age of 70.

T. C. Tarver, Jr., formerly city engineer of Houston, Tex., died recently. Mr. Tarver was 34 years old.

Frederick D. Dollenberg, County Surveyor of Baltimore County, Maryland, died recently at his home in Towson.

W. K. Shelly, Vice President and General Manager of the Tiffin Wagon Co., Tiffin, Ohio, died at his home in Tiffin on Sunday, Nov. 3. Mr. Shelly was born in Washington, Ill., but spent his boyhood in Peoria. In 1888 he came to Tiffin as general manager of the American Strawboard Co., and was manager of that concern for a number of years. He then spent several years in Chicago and New York, returning to Tiffin in 1899 when he organized the Tiffin Wagon Co., which took over the plant of the Tiffin Agricultural Works. He built up the concern from a small business to its present high standing, largely by his own energy and initiative. Mr. Shelly is survived by three daughters, a brother and a sister, four grandsons and one granddaughter. The funeral services were held on Wednesday, Nov. 6.

A Concrete Road 9 mi. Long Between Alexandria, Va., and Camp Humphreys will soon be ready for use. This road is the longest military highway outside of cantonments that has been planned and supervised by engineers from the Office of Public Roads, U. S. Dept. of Agriculture. Several hundred miles of road have been built by the engineers of the office since July, 1917, when assignments of engineers and superintendents of construction to such work were commenced.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, NOVEMBER 23, 1918

Number
21

Keeping Pennsylvania's Main Roads Open*

Description of the Methods Employed by the State Highway Department in Snow Removal Work During the Winter of 1917-18

By GEO. H. BILES†

Pennsylvania has a keen appreciation of the volume and character of present day highway traffic and its demands, due to the state's important industrial position. We feel that it is but the beginning; and new methods, increased energy and study must be applied to meet these conditions.

Our state was put to the crucial test last winter in answering the call of the nation to keep the roads open. I dare say that few of us recall a more severe winter, and it argues well for the future when such abnormal conditions can be successfully combated, as was the case with our main arteries of traffic. The first steps taken to cope with the

situation were to provide an organization to prosecute the task efficiently. This was but an enlargement of the regular force of maintenance employees. I might mention here that we have a colossal maintenance proposition in Pennsylvania in looking after the upkeep of over 10,000 mi. of highways, approximately 65% of which are unimproved. And with a working force in some periods of the season of over 12,000 men, it must be granted modern business principles in organization and operation are essential.

The division of maintenance of the department, composed of the assistant engineers, superintendents, foremen, caretakers, laborers, etc., took complete charge of the snow removal work under the direct supervision of the second deputy commissioner. From the inception of this division in 1913, surveys and studies have been made of snow conditions and

*Paper presented at the conference on "Snow Removal from Trunk Highways," under the auspices of the National Highway Traffic Association, Automobile Club of America, New York, N. Y., Nov. 11, 1918.

†Second Deputy State Highway Commissioner of Pennsylvania.



ROADWAY CLEARED THROUGH DRIFTS—BEDFORD COUNTY, PENNSYLVANIA.

data compiled that have and will continue to serve in good stead, for there are many points where it has been developed that the construction of snow fences is the most economical practice. Considerable of this snow fence has been constructed up to the present time and is ready to be put in place. At present prices, this costs approximately 50 ct. per running foot, in place, and the design closely approximates the railroad standards.

Due to war conditions, a new class of traffic had to be reckoned with in the United States motor convoy, the imperative nature of which justified some of the unusual measures taken. As an example, arrangements were made with the Weather Bureau officials to wire forecasts of approaching storms to the central office at Harrisburg, which information was communicated immediately to the local forces. This afforded an opportunity to anticipate conditions and organize accordingly. The War Department also wired proposed convoy movements, whose schedule was followed closely from the time they reached the western limits of the state until they passed out toward the seaboard. Stations were established along the lines of the highways at the larger towns where motor truck equipment with snow plow attachments, road machines, drags, shovels, etc., were located. The caretakers or patrolmen who were regularly employed on the road were used as a nucleus to create the force to handle the work. Systems of reporting were devised through telephone, telegraph and mail, depending upon the conditions, to convey to the central office the exact status of the work at all times. This information, upon receipt, was charted and made available at once, from which a bulletin was prepared.

It would appear that what is possible of accomplishment in Pennsylvania in this respect is true of most states, for the topographical conditions are such that energy and resourcefulness were taxed to the utmost in overcoming the elements. When one takes into consideration that a major portion of our state is mountainous and many sections are in altitudes of between 2,000 and 3,000 ft., in which there are stretches of highway many miles in length where there is not a sign of habitation for refuge or shelter, being entirely at the mercy of the winter elements, it seems more providential and miraculous than the work of man that such abnormal conditions were so successfully overcome and traffic maintained. Aside from the dearth of labor that was felt over the whole country at this time, there were sections wherein it was impossible to get labor of any character and the mountains and villages for miles around had to be scoured for hands, who were transported by sleighs to the site of the work. To these hardy mountaineers and men who were prompted by patriotic motives great credit is due for the success of the work.

Snow removal, from the experience of the speaker, resolves itself into snow fighting from the time the first snow makes its appearance. Work begins when heavy falls come, by breaking through a track with road drags or small "V" shaped plows drawn by teams. These are followed by the road machines or motor trucks with the snow plow attachments. Turnouts are made at convenient intervals, and as soon as possible thereafter the road opened to the desired width of from 14 to 18 ft., depending upon the traffic. On improved roads every effort is made to remove the snow to within a few inches of the metaled road, in order that no opportunity may be given the traffic to track. What snow remains that does not melt, is removed entirely.

I will qualify the remarks just made by saying that these methods apply particularly to improved roads, for if traffic is permitted to track during periods of freezing and thawing on such highways, the surface becomes affected to various degrees, depending on the type of road. We have a number of miles of water-bound macadam roads with bituminous surface treatments on the main trunk lines, and in order to

preserve them during such periods it is essential to distribute the traffic. On the unimproved roads the snow is not taken off entirely down to the surface, but several inches are left for the travel to pack, and as it softens, more snow is dragged from the sides in order to keep the surface comparatively smooth at all times. Rolling of snow is done on the less important lines, but this has not been very satisfactory on the roads where there is much motor traffic on account of the rough conditions that result when the surface becomes cut up. The snow, being rolled and wet from time to time with sleet and rain, becomes almost as hard as ice. However, there are roads on which travel is light and consists mostly of horse-drawn vehicles, where this method will suffice.

In the work just described, especial attention was given to the drainage, and cuts were made through the banks of snow to the ditch lines at certain intervals, where possible, and drains and culverts kept open and free from obstruction. This precautionary measure produced very good results, for when the snow passed away in the spring, the roads had come through the winter in better shape than they had in any previous year, in spite of the fact that they had been subject to greater traffic and increased weight of loads.

The heavy drifted condition required especial treatment. Drifts were so deep and the bank so high on either side of the road in some places that snow had to be shoveled and hauled out. Snows up to 12 in. in depth can be handled advantageously with road machines and from 12 to 36 in., if not too heavy, can be moved with motor trucks with plow attachments, with excellent results. The truck is run along one side of the highway and back on the opposite side at a rate of about 4 mi. per hour and carries a small crew of men with shovels that are used when the snow piles up in front of the blade, which it will do, especially when the snow is wet. When there is a greater depth than 3 ft., a large "A" shaped plow is used. This implement is 30 in. high at the nose and 6 ft. at the back with 20-ft. legs and 16 ft. wide at the back, held together with movable braces and drawn by a heavy tractor, and it has proven a very economical and effective device. The movable braces are provided for the purpose of permitting vehicles to pass during operation, if same is necessary. The light tractors for this work do not hold the road and have been found unsatisfactory. Mechanical devices are preferable in the majority of cases, but if the drifting is a continuous performance in cuts, it resolves itself into a shoveling proposition.

To keep the roads open under conditions similar to last winter costs from \$50 to \$200 per mile, depending upon the location and other conditions.

In 1912, when our system of roads was taken over for maintenance, the highway laws with respect to keeping up the road were not generally interpreted to mean that snow should be removed, for it was an uncommon thing for the local road officials prior to this time to open the drifts. In many places, the fences along the line of the highways were removed and the fields used until the snow passed away. If the thaws caused the fields to become soft, in which condition the traffic would do them considerable injury, some effort was made to make the roadway passable. This era quickly passed and with the changing and increasing traffic, the demands became great for an open highway the year round, and in 1913 this responsibility was assumed by the State Highway Department and practically all the main trunk lines were kept open from this time on. The records for the winter of 1917-18, which covered the period from December to March, show 22 snowstorms varying in depth up to 16 in., with drifts ranging from 3 to 16 ft. in depth, the general average being 4 to 6 ft.

I firmly believe that where statutes permit—and if they do

not, the legislative bodies should pass enabling measures at once—it should be no longer an optional matter with the road officials in charge of our highways, for when we consider the enormous winter traffic on some of our roads argument is unnecessary. As an example, we have on

record a case in which a traffic census taken on one of our highways when the temperature was down to 25 degrees below zero showed that over 2,000 vehicles passed over the road in 12 hours. The answer is that it is no longer a theory.

The Engineer in Road Work*

BY RODMAN WILEY.†

When one speaks of an engineer he does not necessarily mean a college graduate. Of course, it is very desirable to be a graduate from a recognized school of engineering, as that forms the basis upon which to build with experience. Neither do we mean that a man is an engineer simply because he is qualified to run a transit or level or has had a few years' experience with some engineering corps. Such an idea either in the mind of the man himself, or the people in general, is an injustice to the engineering profession.

It makes no difference what branch of engineering a man may decide to follow, he will find that it takes a great deal of study, years of training and experience and plenty of common sense before he knows the A B C of engineering. In addition he must know how to meet and deal with the public and how to handle men. He must possess more ready information than a member of almost any class of professional men.

One of the best definitions of engineering according to my judgment is "science applied with common sense."

One of the most prominent engineers in this country has said that a man to be a successful engineer must have 75% common sense, 15% chance to display it and 10% education. After all a man to be successful in almost any line of work must have a good stock of common sense.

Were we to intelligently analyze any work that has been done or is being done, we would discover that the engineer's part is not the most insignificant. He has made possible practically everything that is of use to man. As a matter of fact the engineer is the forerunner of civilization, it might be said, the indispensable sentinel of progress.

On October 18, 1917, there appeared the following masterful editorial in the "Canadian Engineer":

Every industry depends directly upon the engineer. There are few points of life where his work has not effected big alterations. Tolerant he must be to human weakness; efficient he must be, for in few other fields of effort is the elimination of the unfit more rigorously practiced. His training is applied science and his practice demands large common sense.

"The engineer is one of the pivots of modern civilization; therefore, he should be more in evidence as a public man. He is well fitted to carry forward the lessons of practical experience in the realm of national affairs."

It is pertinent at this time that you should better understand the aims of the engineers engaged in road work. Some of you might think that on occasions they are arbitrary, dictatorial and altogether undesirable persons, who try to say to the various fiscal courts what they should and should not do. But such is not the case. They are laboring for your interests; they are anxious to see every administration a success regardless of what political power may be in control; they are your servants not your mas-

ters, and they realize that in the final analysis the people are their clients.

It is, of course, but natural that engineers should at times differ from the members of the court, but that is not revolutionary. Honest men differ. A father may differ from his son; brothers often differ, and tonight, even while I speak, noted generals, each willing to give his life for his country, may differ as to the best method of attack on the morrow; but they are friendly differences, each is contending for what he considers the best, and as a general proposition, in the end the man with the most training and experience will rule.

I trust, therefore, you will feel that the engineers engaged in road work are your friends and on that assumption let us view the subject and see if the engineer has any place in such a great work.

In the financial end, engineers are oftentimes called upon to make an examination of the road needs of a community, the possible resources, and to report to the constituted authorities the amount of money needed and the best method of securing it; at other times they advise with the proper authorities to see if their program is sound from a financial standpoint, just the same as engineers are called upon to report to bankers and brokers on the soundness of investments in other lines of work. Today very few investments of any size are made unless the proposition has the approval of some well-known engineer in whom the investors have implicit confidence.

In the "Scientific Monthly," in an article by the well-known engineer, Dr. J. A. L. Waddell, there appeared the following able statement:

"Public recognition is truly the main object of engineering endeavor, because engineers more than any other class of people place honor and glory above the almighty dollar."

Everyone within the sound of my voice has seen on numerous occasions the mistakes that have been made by viewers in locating roads. It must be remembered that wherever a road is built schoolhouses, residences, churches and business houses will follow the development. In case the location is bad, it is more difficult and oftentimes impossible to provide any remedy, because if the location is changed all the improvements are lost, consequently the taxpayers are compelled from year to year to pay a heavy cost for maintaining an improperly located road. On the other hand, very few of you have ever seen a road located by good engineers that ever needed to be changed. France, Belgium, England and Italy realized centuries ago that whenever any road improvement was started it should be in charge of the most competent engineers in the nation, consequently the roads in those countries have been located with such foresight, such knowledge of the development of the country that it is almost impossible even at this time with all our advanced ideas and new methods of travel to make any desirable changes. Right in our own state when we speak today of the old L. & N. pike there is foremost in every man's

*Paper prepared for presentation at the annual convention of the Kentucky Highway Engineers' Association, Owensboro, Ky., Nov. 12-14, 1918, which has been indefinitely postponed.

†State Commissioner of Public Roads of Kentucky.

mind the thought that the road is located properly and any suggested changes are viewed with suspicion. It has stood the test of public criticism as well as the elements of destruction and the expense for maintenance has at all times been a minimum.

The great trouble has been principally the fault of the taxpayers. They have not called for a business-like administration of the road affairs of their counties, and consequently they have not received it. A road is simply one of the systems of transportation and its location requires as much skill on the part of an engineer as the location of a railroad—if not more—because a railroad company usually has ruling grades, ruling degrees of curvature and no departure is allowed from those standards, whereas when locating a road an engineer must have vision. In his mind's eye he must see the country as it will grow and as it will be years after the road is built. Consideration must be given to the finances of the county, which is usually not the case in railroad work. A railroad company might expend thousands of dollars to reduce a grade one-half per cent., to reduce the degree of a curve one or two points, but in road work an engineer adopts such grades as will insure the economical construction of the highway, provided, of course, that traffic will not be impeded. Highway location calls for rare judgment on the part of an engineer.

The grading of a road requires the same amount of skill and experience on the part of the man doing the work as does the grading of any railroad or interurban line. The same kind of machinery, the same instruments are used for both classes of work. A railroad company never considers for one moment starting any construction work without having experienced engineers on the ground at all times to see that it is properly done; a contractor doing the work knows from bitter experience that he cannot hope to make money unless he has an experienced man in charge, and I cannot understand how men entrusted to build roads can figure that they can depart from the usual custom or that they can break all precedents and do something that railroad companies and contractors have found to be impossible from an economical standpoint and impracticable from all other angles.

When it comes to surfacing any road, the man in charge should have a thorough knowledge of the behavior of all local materials under different kinds of traffic and different climatic conditions, as well as understanding the method of doing the work. Experience has shown that attention to minute details is necessary if any type of road is to be properly built. All of you have seen roads built of stone and you know that one man can take a certain amount of stone and build a good road and another man will take the same class of stone and the same amount of stone and build an inferior road. That shows for itself that there is something in a man's knowing how. However, the most important thing about the surfacing of any road is knowing the type to select. A great many men have had sufficient experience to know how to build a gravel road, a macadam road, or almost any type of road that might be selected; but the real engineering comes when we are trying to decide the proper type to build in certain localities. To intelligently make a decision, consideration must be given to the finances of the district, availability of materials, local materials, the kind and volume of traffic passing over the road, possible increase in traffic due to the improvement, and the approximate cost of maintaining any type that is decided upon. Hundreds of millions of dollars have been wasted in this country by building the wrong type of road. In this state, in the central section, we find almost invariably macadam roads, in western Kentucky gravel roads, and in most instances those types have been built without any consideration whatever being given to the traffic that has passed or will pass over the road during its life. To my

mind, the selection of the proper type of road requires the highest type of engineering ability and before building any road it would be economical and certainly good common sense to get the advice of the foremost engineers in the country as to the most economical type.

On many of the roads in this state even at this advanced age we find that it is impossible to transport the ordinary road machinery because the drainage structures will not carry the loads. Sometimes you see fairly good roads on which there have been installed drainage structures totally unsuited to the traffic. We also find that structures of the wrong size have been built; it is not uncommon to see a 100-ft. span trestle where perhaps a 4x4-ft. culvert would suffice. Often we see a culvert pipe installed which is totally incapable of carrying the water; and even the determination of the proper size of any drainage structure is a high class engineering problem. Everyone should know by this time that the design of culverts and bridges is a branch of engineering that requires years of training and experience.

No railroad company would consider for a moment letting one of their section foremen build a bridge or culvert according to his own ideas; on the contrary, even structure is carefully designed, carefully checked several times before it is ever allowed to be installed. The great trouble with highway work has been that most everyone thinks they understand how to design and build drainage structures, and we find today our highways adorned with structures which have little to commend them except the enormous prices paid by an unknowing public.

After a road is built it must be maintained and everyone who has had any experience in road maintenance knows it should not be attempted by any but experienced men because it is one of the easiest ways known to waste money. Just what to do to a road in certain stages of deterioration is one of the most difficult things for even the most experienced engineers to determine.

I have seen some men use 500 cu. yd. of stone to the mile and make less showing and do less good than an experienced man would with a hundred yards of the same material.

It has always occurred to me as being peculiar that separate accounts have not been kept showing the expenditures which have been made on a road. Today it would be impossible to go to any county in this state and find the cost of a single mile of road unless that mile had been built under state supervision where cost records are accurately kept. It is part of the training of an engineer to analyze costs, to segregate costs so that they know not only the original cost of any improvement, but also what it has cost from year to year; only by keeping and knowing such things can we ever be certain that we are doing economical work.

I have endeavored to show you that every phase of road building is an engineering problem and the sooner that fact is realized the sooner will the taxpayers be properly protected. But the thing I am contending for will not come over night. Men without any knowledge of the subject will be elected to office on some fake issue and will continue to build roads according to their own pet theories, many of which will be at variance with good engineering, but the taxpayers should remember that they are paying for all mistakes made.

Never before in the history of the world has mankind been so dependent upon the engineer. The existing war is essentially a war of engineers; for it is they who are designing the guns, designing the ships, the gas bombs, the depth bombs, the aeroplanes, the ammunition, building the roads, cantonments, the trenches, railroads and bridges for our armies, and the public is now beginning to recognize the

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GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

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ALL-YEAR MOTOR TRAFFIC

The demand for the removal of snow from rural roads furnishes one of the most striking evidences of the change that the past few years have brought about in the use of the motor-driven vehicle.

Only a comparatively short time ago, the motor vehicle was primarily a pleasure vehicle. Its price put it beyond the reach of all but the well-to-do, and its use for anything except pleasure was the exception rather than the rule. Within a few years lower priced cars made their appearance and with the resulting wider distribution came a gradual increase in the utilization of the motor car for business purposes. This continued until at present the automobile is essentially a means of transportation. During the same period the motor truck has invaded the hauling field, largely displacing the horse-drawn truck, and, of late, becoming a competitor of the railroad.

So long as the motor vehicle remained a pleasure vehicle, its use, naturally, was confined to the summer months. When it began to be used for business it ceased to be a part-time machine, especially in cities where it was possible to use it most of the year. With the war's demands upon transportation, motor hauling over long distances assumed a tremendous importance and necessitated a serious effort to open and keep open main routes of highway traffic. In many of the northern and eastern states the local authorities and the state highway departments took the matter in hand last winter, and kept large mileages open to traffic. Plans for similar work—in some cases on an even larger scale—have been made and are being made for the winter to come.

While these plans were formulated largely as war measures, the end of the war should not cause their abandonment. Motor truck transportation has come to stay; and to render anything like the service of which it is capable it must be an all-year business.

The coal situation, the necessity of moving foodstuffs to the seaboard for export, the ordinary business of the country, all demand the keeping of transportation facilities at the top notch of efficiency. This is impossible unless all-year motor truck transportation is made a reality.

THE FIRST TASK IN READJUSTMENT

With the ending of the war, road builders are confronted with a number of pressing problems. Highway work has been held back for more than a year while heavier and heavier demands have been made upon the country's highway system. Not only has new work been stopped except in a comparatively few instances, but conditions have greatly hampered reconstruction, repair and even maintenance.

As a result of unavoidable shortages of labor and materials, and of restrictions that many road builders will always regard as avoidable, the roads probably are now more in need of maintenance and minor repairs than ever before. This is especially unfortunate just at this time, for a road's ability to withstand the effects of winter depends largely upon its condition when winter begins.

At this particular time, therefore, putting the roads into shape for winter is one of the urgent tasks confronting road builders—perhaps the most urgent of all.

POLITICAL CHANGES

Road builders are awaiting with more than a little curiosity developments in the highway departments of several states in which the political complexion of the administration will change as a result of the election this month.

It is unfortunate that road building has to pay tribute to politics, but, under present conditions, unavoidable. The direction of the road work of an entire state is distinctly a man-size job. It requires executive ability of a high order and a number of other qualifications not generally possessed by a mere politician. In addition, experience counts for a great deal—for so much, in fact that a new incumbent ordinarily labors under a considerable disadvantage for some time. Conversely, a man who has occupied the position for a term or two has generally gained experience that enhances his value to the state.

Unless a man is very poorly qualified for his office—and we are glad to say that there are few such among present state highway officials—there is seldom any justification for change with change of administration. If any governor proves broad enough to apply this principle and put the public welfare before party, we shall be glad to note the fact.

THE REMOVAL OF RESTRICTIONS UPON ROAD WORK

The prompt removal of most of the restrictions that have hampered road building during the past year will be regarded by road builders with a great deal of satisfaction.

As noted elsewhere in this issue, the Capital Issues Committee is all that remains as a bar to resumption of such activities as weather conditions permit; and the necessity of trimming 1919 programs to meet the views of Government officials no longer exists. Except for the improbability of a resumption of hostilities, nothing seems likely to prevent the coming of the unprecedented era of road improvement that has been looked forward to for some time by those most closely in touch with events in the road building field.

We believe that most road builders have felt that the Government's road building policy during the past eighteen months has lacked consistency, wisdom and foresight. "Good Roads" has been outspoken in its opposition to measures that it has believed to be against the best interests of the country, and quite as prompt in its advocacy of those policies that seemed likely to produce good results. It has continually emphasized the importance of roads in time of war, and we believe that had the war lasted long enough our position would have been justified. We are equally sure that peace will demonstrate the validity of our contention that good roads are necessities, not luxuries—that, in peace or in war, a nation is dependent upon its highway system.

Macadam Maintenance*

By R. C. HEATH.†

The greater part of the improved roads in Kentucky are built of water-bound macadam, and I will, therefore, confine my remarks to that type of road. Within recent years the automobile has come into common use and it is evident to all that the roads are worse today than ever they were in spite of the thousands of dollars which are constantly being spent on them. You seldom ride over a smooth macadam road with no holes and rough places. We do not want to make our roads smooth just because it is more pleasant to ride over them—it is a well established fact that a rough, badly shaped road will wear out much quicker than a smooth one.

Macadam roads wear out in two ways; first, the direct contact of the wheels of vehicles and the action of the elements wear out the surface; second, the weight of the vehicles and frost action cause the stones of the road metal to wear on one another inside the pavement itself. It certainly stands to reason that if a road is full of holes the road metal wears out quicker both internally and on the surface because a loaded vehicle instead of rolling smoothly over the surface, pounds and tears at the metal as it is hauled into and out of the depressions.

Both steel-tired vehicles and automobiles injure a macadam road but in different ways. Steel-tired vehicles grind up the road metal into dust and the automobile sweeps this dust off the road surface. There is undoubtedly less internal wear on a road where the traffic consists of automobiles and motor trucks because the rubber tires and improved springs absorb a great deal of the shock of the wheels striking the surface, and the surface wear is also less, because rubber tires do not grind the stones into dust. The effect of such traffic is to make the metal fall apart or ravel by removing the dust which binds the stones together. Steel-tired wagons cause more internal wear because the full effect of the load is carried to the metal as if it had been struck with a hammer; and such tires also cause more surface wear by grinding the metal into dust. A macadam road, subjected to steel-tired traffic alone will last a long time, simply because the dust is not removed by slow moving traffic and the road metal does not ravel. Most of our roads are carrying today a mixed traffic consisting of heavy wagons, automobiles and motor trucks and are, therefore, wearing both internally and on the surface. Our maintenance problem then is to care for the roads in such a way as to prevent as far as possible these two kinds of wear.

To prevent excessive internal war, we should keep the holes filled and the surface smooth and even. During construction, every care must be used to keep low or high places out when spreading the metal and to thoroughly bind the stones together with screenings so that all voids are filled to the very bottom of the metal. I consider that the most important part of any macadam work is the spreading of the metal and the thorough filling of the voids the stone.

To prevent surface wear, the surface must be covered with some kind of material that will prevent the wheels from grinding directly on the metal. To prevent raveling the surface must be covered with some kind of material that will prevent the automobiles from sweeping the dust from between the stones. Fortunately there have been devel-

oped several materials which will perform these services, two of which will be used as illustrations. They are asphaltic oil, a product of the petroleum oil well, and tar, a product of the coal mine and gas-house. These materials are spread over the surface in a thin sheet and covered with sand or stone chips. There is considerable prejudice among many people against the use of oil or tar on road surfaces because of the results obtained by many cities on their streets. The reasons for these failures are generally the same everywhere—carelessness in applying the bitumen, failure to clean the road surface and failure to cover the bitumen after the application. Bitumen must be applied in small quantities on an absolutely clean surface and must be covered with sand, screenings or chips—the material must be applied in small quantities so that it will not roll up under traffic and because only a little is needed to give the result; the surface must be clean so that the material may stick to the stones, because it will not stick to dust; the material must be covered so that it will not be removed on the wheels of vehicles, and so that a mat will be formed over the surface.

The use of oil or tar on road surfaces is frequently called "carpet" treatment. This name is a good one because the effect of oil or tar is a great deal like that of a carpet on the floor of a room. You have all noticed the floors of the hallways in the old court houses—hollows are worn into the hard wood sometimes as much as an inch deep by the shoes of the hundreds of men who have walked there. Now, compare the condition of this floor with the one in the county judge's office, where there has always been a carpet on the floor—it is not marred or worn at all, because the soft yielding carpet has taken the wear. Of course, the carpet has worn out from time to time and a new one has had to be laid, but the main result has been obtained—the floor has not worn out. It is the same with a bituminous "carpet" treatment on a road; you will have to renew the carpet when it is worn out, but the main result has been obtained—your road is not worn out.

Do not think that if you apply oil to a road or patch the holes once or twice your problem is solved, that you can then take your outfit away and build a new road somewhere else with no more thought for the old road. That is not real "road maintenance." The only way in which maintenance can be successful is for the engineer to keep everlastingly at it. Patrolmen must be employed to take care of the road and must start at work on the very day it is finished. Holes must be repaired as soon as they start and a man must be ready on the job to see them start. The surface must be kept unbroken so that no water can get into the metal and soften it so that a hole can start. If you are not going to take the best possible care of your roads it is better not to start at all; it is a waste of money and a waste of time to half repair a road.

People say it costs too much to maintain roads by using these new fangled methods—oil and tar and black greases of all kinds. The people are wrong; and they are wrong because they do not understand the financial end of road building. Suppose it costs \$3,000 per mile to place the metal on this road and it will last, with no care at all, for three years. At the end of that time it will be necessary to resurface. Even if you have not spent one dollar on that road it stands you exactly \$1,000 per mile per year. Every hole in it represents a dollar or two that you spent to put down the metal, which has disappeared somewhere. Now, wouldn't you be willing to spend \$1,500 a mile to make the road last

*From a paper prepared for presentation at the annual convention of the Kentucky Highway Engineers' Association, Owensboro, Ky., Nov. 12-14, 1918, which has been indefinitely postponed.

†Road Engineer, Kentucky Department of Public Roads.

three years more? That expenditure would make the road cost \$4,500 for six years' service, or \$750 per year. But if you let it go without repairs it will cost you \$6,000 for six years' service, and your road is always getting worse instead of better. In other words, spend \$1,500 to save \$1,500, not to mention the saving in wear and tear on your wagons and automobiles. That certainly looks like a good investment. These figures that I have given are reasonable ones. How many of you men have seen macadam roads which are in good shape after three years' service? I do not believe there is a single heavily traveled macadam road in this state, which is three years old, that does not need resurfacing right now, and I do not believe there is one county which has spent an average of even \$100 a mile on its macadam roads since they were constructed. Most of the counties have spent not one penny for maintenance. If you will spend one-half in maintenance of what you are losing by not maintaining, your roads will always be good and at the end of ten years you will have something to show for your money except sad experience and worn-out roads.

The opinions of engineers regarding the best methods of repairing roads will differ many times, but all will agree that no road builder can afford not to maintain his roads. The people are not only entitled to roads, but they are entitled to good roads. They are paying for roads because they expect to get their money back in service from the roads not because they want to indulge in an expensive luxury. If the roads are not kept in good condition the people are not getting the service for which they have paid. No man will own a house nowadays without having it properly insured, and he is willing to pay a fair premium for the protection against loss. "Road maintenance" is simply "road insurance," and the people must pay the premium in order to be protected against the wearing out of their roads.

In conclusion, let no road engineer think that maintenance work is beneath his dignity as a road builder. The biggest men in the road game today are studying the problems of maintenance, realizing that they are the hardest problems that remain to be solved. Maintaining a road means much more than throwing a few stones into the holes or spilling a little oil on the surface. There is plenty of opportunity for careful study and experiment, and all such work must be done with the greatest skill and care.

Maintenance work is not difficult in itself, but most engineers fail in maintaining roads because they will not take pains enough in getting careful work. The secret of successful maintenance is all in the care with which the work is done.

The Engineer in Road Work

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truth of the saying: "When something of importance has to be done, it is necessary to call in the engineer."

Remember that engineers have always existed and that there will at all times be sufficient work for them, and they will be sought after, so it is not a question of trying to create positions for them. The people should realize that they, more than the engineer, will be benefited by his services and, when the sentiment demands, engineers always have and always will qualify for the position. There is almost no engineering feat that cannot be accomplished.

Noted men have made the statement that, of the \$300,000,000 expended in this country on roads last year, at least one-third was wasted, and it is now time for the people to take this matter in hand and see that not a single piece of road work is attempted unless done by skilled engineers; then every cent expended on location will be a permanent investment, every fill and every cut that is made will be properly done, every bridge and every culvert built so that

it will carry the loads that pass over the road. The type of surfacing used will be the most economical one, and the roads when once built will be maintained instead of being allowed to deteriorate from day to day. Every cent expended will be properly accounted for, and then and only then will the taxpayers realize a dollar's worth of work for every dollar of their money invested in roads. When such time shall come the people will be willing to pay taxes for roads, because they will see that their interests are properly safeguarded, and we will have more and better roads at a cheaper price.

Road Work in Marion County, Indiana Over \$2,000,000 Expended in Highway Improvement During the Past Three Years

During the three-year period ending Oct. 1, 1918, a total of over \$2,000,000 was expended for road work by the Board of County Commissioners of Marion County, Indiana.

This sum included brick and concrete road contracts amounting to \$1,418,290, and gravel road repairs amounting to \$730,000.

During the past two years the efforts of the county authorities have been mainly directed toward assisting the Government in the improvement of roads to Fort Benjamin Harrison. Practically all of the contracts awarded for this work will be completed by the end of the road building season.

Pennsylvania Automobile Registration

Highway Department to Begin Shipment of License Tags Earlier Than in Former Years

Shipment of 1919 automobile license tags will commence on Dec. 1, two weeks earlier than usual, according to a recent announcement from the Pennsylvania State Highway Department.

This early start is expected to relieve mail congestion later in the month, and also to insure the receipt of tags early enough to permit their use on Jan. 1, as required by the state automobile law. As the State Highway Department has 118 men in the Army and Navy it will be obliged to do much of the work connected with the distribution of license tags with inexperienced help.

Restrictions on Road Work Removed Capital Issues Committee Only Bar to Improvements

The United States Highways Council has announced that highway projects need no longer be submitted to it for approval, that previous disapprovals are revoked, and that pending propositions require no further attention.

It has also announced that state highway departments will not be asked to submit programs for next year's work, and that the procedure in securing materials and transportation should follow normal practice.

Removal of the restrictions does not affect highway bond issues, the Capital Issues Committee still retaining the right to approve or disapprove. It is understood that the Treasury Department takes the position that the necessity of floating another war loan in the spring makes it advisable to keep the security market open principally to the Government. This is interpreted to mean that road work which it is proposed to finance by bond issues will have to be proved advisable in the light of the national situation. It is also expected that projects financed without bond issues will be affected to a considerable extent through the committee's influence with bankers and business men, who will be expected to use their influence against capital propositions believed not to be compatible with the national interest.

MEETINGS

Calendar of Coming Meetings

Dec. 9-13.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Dec. 11-13.—Highway Industries Association.—Convention, Chicago, Ill. Secretary, Henry G. Shirley, 302 Maryland Building, Washington, D. C.

Feb. 25-28, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

Kentucky Highway Engineers' Association

The meeting of the Kentucky Highway Engineers' Association, which was to have been held at Owensboro, Ky., on Tuesday, Wednesday and Thursday of this week, has been indefinitely postponed on account of the prevalence of influenza throughout the state. It is doubtful whether the meeting will be held before spring.

Two papers which were prepared for the meeting, and of which "Good Roads" had secured advance copies, are printed on other pages of this issue.

Pennsylvania State Highway Department

The semi-annual convention of the engineers of the Pennsylvania State Highway Department was held at the Capitol Building, Harrisburg, Pa., Wednesday, Nov. 13.

The meeting was followed by an inspection trip by Commissioner O'Neil, Deputy Commissioners Hunter and Biles, and the district engineers over the state highways and state aid roads in the eastern portion of the state.

American Association of State Highway Officials and Highway Industries Association

The joint convention of the American Association of State Highway Officials and the Highway Industries Association at Chicago next month has been postponed from the week of Dec. 2 to the week of Dec. 9.

The change was made in order to avoid a conflict with the meeting of the war service committees of the United States Chamber of Commerce. The new dates were noted in the "Calendar of Coming Meetings" in last week's issue.

PERSONAL MENTION

C. L. Wartelle of the Engineering Department of Seattle, Wash., has been commissioned a first lieutenant in the Engineer Corp.

R. W. McCrory of the Engineering Department of Seattle, Wash., has been commissioned a first lieutenant in the Engineer Corp.

Charles Davis has been appointed acting city engineer of Spokane, Wash., during the absence of City Engineer A. D. Butler, who has entered the construction division of the Army.

James W. Costello has been appointed supervisor of street cleaning and garbage removal for the City of Newark, N. J.

C. M. Cary has been appointed acting superintendent of the Bureau of Ashes and Garbage of Binghamton, N. Y.

E. K. Troil of the Department of Engineering of Seattle, Wash., has been commissioned a lieutenant in the Engineer Corp.

Calvin E. Cock, of Spur, Tex., has been appointed engineer on the road work to be done in Baylor County, Tex., under a \$3,000,000 bond issue.

Walter C. Paton, City Engineer of Excelsior Springs, Mo., has been commissioned a captain and assigned to the 412th Engineers, Camp Sheridan, Ohio.

OBITUARIES

Earl Miller of Berkeley Springs, W. Va., died recently, aged 28. Mr. Miller was county engineer of Morgan county and district engineer of Berkeley, Morgan and Jefferson Counties for several years.

J. C. Hallock, formerly deputy engineer of the Department of Streets and Public Improvements of Newark, N. J., died recently in Ecuador, where he had gone to make a study of flood prevention for the government of that country. Mr. Hallock was 49 years old, was a graduate of the Rensselaer Polytechnic Institute, and had been director general of public works of a small South American state shortly after his graduation. He was made assistant engineer in the Newark department in 1909, and had charge of meadow reclamation and general development work at Port Newark.

PUBLICATIONS

"MEMPHIS." Paper 6 1/2 x 9 3/4 in., 64 pages and covers, inset maps. Published by the Memphis Chamber of Commerce, Memphis, Tenn.

This booklet which carries the subtitle "Advantages, Resources and Opportunities It Offers Manufacturers and Distributors," is a detailed description of the city and its business facilities. Several paragraphs refer to the streets of the city and the highways in the surrounding country.

MOTOR TRANSPORTATION GUIDE. Paper, 5 x 8 in., 60 pages and covers, inset map. Published by D. Schubert, 2 Columbus Circle, New York, N. Y. \$1.

This booklet contains a list of about 850 cities and towns situated within 100 mi. of New York City, with the distance of each from New York. The list is arranged alphabetically. In addition, there are listed 19 routes from New York to the larger cities included in the main list, and several pages of distances between points in New York City. The map, which is taken from the 1918 Automobile "Blue Book," shows Massachusetts, Connecticut, Rhode Island, New Jersey and Delaware, most of New York, Pennsylvania and Maryland, and parts of Maine, New Hampshire, Vermont and West Virginia. The 19 routes listed in the booklet are shown on the map as well as the regular "Blue Book" routes.

The Office of Public Roads and Rural Engineering of the Department of Agriculture has been assisting the National Research Council in the preparation of a report on deposits of rock, sand, gravel and other material, according to a recent announcement from the department. The work has been done for the benefit of the War Industries Board and other Government agencies.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

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NEW YORK, NOVEMBER 30, 1918

Number
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Road Work in Wayne County, Michigan

Twelfth Annual Report Reviews Operations of the Board of County Road Commissioners
During the Fiscal Year of 1917-18

The principal construction work undertaken by the Board of County Road Commissioners of Wayne County, Michigan, during the year ending Sept. 30, 1918, was done on nine roads, according to data in the 12th annual report of the board for the fiscal year of 1917-18.

A large part of the work consisted of the building of concrete pavements. The Mack Road was completed from the Detroit city limits to the Wayne County line. It is paved with a 2-course concrete pavement, 20 ft. wide, and is 28 ft. in width, over all. Work done during the year cost approximately \$84,500. The Vernier Road between Jefferson Ave. and Mack Road was also completed. This is also a concrete road, 24 ft. wide, with a total width of 30 ft. The cost of the work done during the year was approximately \$70,600. The Seven Mile Road was completed from Grand River

Road to the village limits of Northville, making available a continuous improved road from the shores of Lake St. Clair to Northville, a distance of about 31 mi. It is paved with 2-course concrete, 18 ft. wide, and is 28 ft. wide over all. The cost of the 1917-18 work was about \$34,000. Bridge, Park and Lagoon Aves. on Gross Ile, designated as the Grosse Ile Road, were also completed, and were connected with the River Road at the bridge approach on the mainland. A 2-course concrete pavement, 18 ft. wide, was put down at a cost of approximately \$87,000. The Warren Road was graded for a distance of about 4.5 mi. and an 18-ft. concrete pavement was completed for a distance of about 2.5 mi. The work done during the fiscal year amounted to approximately \$131,000. Gratiot Road was resurfaced and widened for a distance of 1¾ mi. It has a 20-ft., 2-course



RELOCATED ROAD AND NEW BRIDGE ELIMINATING BAD CURVE AND GRADE—BELLEVILLE-ROMULUS BRANCH OF HURON RIVER DRIVE, WAYNE COUNTY, MICHIGAN.

concrete pavement, and the cost during the year was about \$43,000.

In addition to these concrete pavements water-bound macadam was put down on 2.1 mi. of the Maple Road at a cost of about \$15,000, and on a section of Snyder Road at a cost of about \$3,800.

Lack of transportation facilities prevented the completion of concreting on the Belleville-Romulus branch of the Huron River Drive, but at the date of the report the road was being graded, the heavy fills having been completed and culverts built. Work done during the fiscal year cost about \$19,700.

Maintenance expenditure during the fiscal year amounted to over \$100,000, of which about \$10,000 was used for the removal of snow and ice. An important feature of the work done during the year was the construction of penetration macadam shoulders to increase the effective widths of a number of roads. A 3-ft shoulder was built on each side of the 18-ft. concrete pavement on Woodward Ave., and similar work was done on Warren Ave. where the concrete pavement is only 12 ft. in width. Preparations have been made for the same kind of work on portions of the Seven Mile Road and the River Road. The work on Woodward and Warren Aves. cost about \$14,800.

Work classed as maintenance in the report comprises, besides the work done on the road surfaces, work on shoulders and ditches, the cutting of weeds and brush along the roads, the rebuilding of culverts, and the construction of

guard-rails. Following their regular custom, the road officials of the county kept gangs at work during the year making small surface repairs with tar, sand and chips. A weed cutting gang was kept on work during the entire season, commencing about June 1, and a ditching gang was kept at work throughout the summer on Gratiot, Van Dyke and Michigan Roads. Two gangs were employed removing sod and refuse from the shoulders of a number of the roads and another gang was employed all summer in the construction of guard-rails at dangerous turns and along deep ditches.

The resurfacing experiment made two years ago was an unqualified success, according to the report. The work consisted of widening a section of Grand River Road from 16 ft. to 20 ft. and resurfacing the pavement with a 3-in. course of concrete.

The superelevation of curves was given little consideration in previous years, but the commission has come to realize its necessity and has adopted a policy of super-elevating all curves with a radius of less than 700 ft. On right angle turns sufficient right of way is secured to put in a curve with a radius of 100 ft. The concrete pavement is widened 4 to 8 ft. and the outer edge of the pavement made 18 in. higher than the inner edge. The change in the cross-section is made gradually and is figured to take care of traffic of vehicles traveling at 25 mi. an hour. Curves having a central angle greater than 90 deg. are given smaller super-elevations.

Snow Removal and Federal Requirements for Highway Transport *

By RAYMOND BECK†

The entire world looks to the United States for solving problems of direct importance to the war and the post-war period. Practically every endeavor will hinge on the question of adequate transportation, in which highways transport work will form a potential part. America in turn will depend on the highways transport committees of the various states and the state highway departments or commissions to make effective the most efficient and continuous utilization of our highways—in fact, our work will need to be intensely vitalized and kept functioning during the present winter.

My experience with highways transport work dates back to the inaugural period of the automobile in this country, during which period I was associated with this Automobile Club, in charge of the bureau of tours. At that time we concerned ourselves with the transportation problems of the passenger car only—with the tourist in his efforts to "see America first." The work entailed a study and record of transport highways that were most serviceable for tourist traffic. The work extended from the detailed surveys of the East to the main arteries of our western coast. I have worked with the problems of highway transport from the transition of only passenger traffic to today's field where commerce and industry as well as agriculture are the most important users. The advent of the motor truck and its potential possibilities has practically revolutionized our ideas with relation to the use of the highways. Today it is the

business of the country that is the big consideration in the utilization and future construction of our roads. We all know that railroad construction has not kept pace with the extension of our business world; that the present rail lines are taxed to their utmost; that truck traffic is desired by all for short hauls; that the big field of the motor truck extends into areas not reached by any other adequate transport facility. I desire to emphasize the fact that the railroads today desire to eliminate the short haul and to place same on the highways. The short haul is the sphere where the motor truck is best adapted. It is here to stay and must be reckoned with accordingly.

It does not require argument on my part as to the reasons for snow removal. If business requires highways transportation as a means to a more serviceable distribution of its products, then business will demand snow removal on the highways that are most essential for the operations. It is perfectly obvious to you as business men that if we spend \$100,000 for a highway—which highway, of course, is built primarily for business purposes—and if on account of snow we are prevented from using same 20% of the year, then we are not realizing the full value of that highway and business transportation is accordingly affected. I am trying to bring out the fact that the commercial highways are the business transport veins of our country, and when you allow flood, or other damage, deterioration, snow or other causes to stop the use of the highway, then you are preventing business from operating most efficiently. And today we are faced with the problem where every one should put his shoulder to the wheel—to help business—to restore

(Concluded on page 207)

*Address at the conference on "Snow Removal from Trunk Highways" held under the auspices of the National Highway Traffic Association, Automobile Club of America, New York, N. Y., Nov. 11, 1918.

†Field Engineer, Highways Transport Committee, Council of National Defense.

GOOD ROADS

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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HIGHWAY TRANSPORTATION AS A BUSINESS

As the part that motor trucks are to play in the transportation of the future becomes apparent to the general public, there will be many who will see the possibility of profit in the business of hauling commodities over the highways. The result will be that not a few will rush into such enterprises without the capital, experience and ability necessary to success, and eventually will be driven out by the competition of those better fitted for the undertaking. As a matter of fact, a tendency in that direction is already observable in the multiplicity of small concerns that have inaugurated regular services.

In this connection it may be well to emphasize a warning sounded by Assistant Postmaster General Blakslee in addressing the National Highway Traffic Association a few weeks ago. Before delivering the address printed in "Good Roads" of Nov. 16, he called attention to the possibilities outlined above, laying particular stress upon the futility of any attempt to compete with the Post Office Department.

The one great advantage possessed by the department is, of course, its monopoly of the carrying of first-class mail. A small leather pouch containing 25 lb. of letters or other matter mailable at first-class rates—3 cts. an ounce—will pay all the costs of a trip of ordinary length and leave practically the full capacity of the truck for a load on which the transportation charges will be all profit. It is evident that it would be almost impossible for any organization to compete with such conditions, unless the postal service should continue to deteriorate until it reached such a degree of inefficiency that shippers would be willing to pay higher rates to some other carrier.

These conditions would obtain only on routes utilized by the Post Office Department, but these will cover a very large territory if the department carries out the ambitious plans it is understood to have formulated. From the address by Mr. Blakslee and reports from a variety of sources, it seems likely that the motor truck parcel post will be developed along lines similar to those which rural free delivery has taken, and that, eventually, it may reach all sections in which business is to be had. Indeed, if an appropriation of

\$300,000 will maintain a service yielding a revenue amounting to over \$2,000,000—as stated by Mr. Blakslee—there would seem to be no limit to the possibility of expansion.

It is certain that no private undertaking in the highway transportation field could hope for any such returns. At the same time, those equipped to carry on the business of highway transportation will find it profitable, and doubtless there will always be fields where the government's competition will not be a factor. The business must be done and every possible encouragement should be offered to the establishment of truck lines to take care of it.

FEDERAL AID AND FEDERAL CONTROL

The suggestion made by State Highway Commissioner Ehrhart of Colorado in a letter to Ira R. Browning, State Highway Engineer of Utah, which is printed elsewhere in this issue, opens up a wide field for discussion, not only at the coming convention at Chicago, but at other meetings for the consideration of matters pertaining to highway work.

The plan proposed by Commissioner Ehrhart contemplates the lending of the credit of the United States to the individual states for the raising of funds for the improvement of main roads. The amount asked—\$50,000,000 in 1919 and \$50,000,000 in 1920, or a total of \$100,000,000—is larger by a third than the total amount provided for a five-year period by the Federal Aid Road Act of 1916. The method of apportionment is the same as that utilized in the existing law.

Of late there has been evident a growing tendency to favor greater participation in road work by the Federal Government. Much of the heavy traffic during the war has consisted of Government vehicles, or vehicles on Government business. There has also been a keener appreciation of the value of good roads to the nation. These conditions have naturally enough given rise to the feeling that the central government should bear some of the cost of the construction and maintenance of the roads it uses, not only to relieve the states of burdens sometimes heavier than they can bear, but also to effect a more equitable distribution of the cost.

The position which Congress would take on a proposition of this kind is not certain. There is a very considerable number of members in both the House and Senate who are known to be anxious to cut expenditures as much as possible in the inauguration of a program of economy. At the same time it is understood that administration measures looking to large expenditures for road building are under consideration. It is also known that further issues of Liberty Bonds are to be floated early in 1919.

All of these factors must be taken into account in the consideration of Commissioner Ehrhart's proposition, and there are certainly no organizations or individuals better able to give the subject intelligent consideration than are road builders.

Another point that is bound to come up before any measure of this kind can be put into effect is the extent of federal control over work done wholly or in part with federal funds. It is inconceivable that the Government would make any such substantial contribution to road work without insisting upon a certain measure of control over the expenditure of the money. It is also certain that state officials would insist upon having some say in the matter, though the extent to which the highway departments would be willing to surrender control to the Government would vary in different states. This would be a matter requiring the most careful and thorough consideration.

Until the passage of the Federal Aid Road Act in 1916, the Government took practically no part in road building and, consequently, had no control over that done by state and other authorities. The adoption of federal aid brought a certain measure of control to the Government, and during

the war very large powers were assumed. While it is to be expected that the control exercised as a war measure will be relinquished, the adoption of any plan for lending federal credit to the states on a large scale would make necessary a considerable increase in the supervisory powers vested in the Government.

There is already a demand for the establishment of a federal highway department of some sort, and this demand will grow with any enlargement of the federal aid idea. And regardless of any action on the Ehrhart plan, greater participation in road work by the Government seems probable. The details of the organization to do this work will certainly give rise to much discussion and there will be a variety of opinions.

Without, at this time, attempting to put forward any comprehensive plan of organization, attention may well be directed to a few salient points.

In the first place, road building is too important to be left to a subordinate bureau of any of the existing departments. Moreover, none of these is the logical place for it—there is no more reason for delegating the supervision of road work to the Department of Agriculture, than to the Post Office Department, or the Department of the Interior or the Department of Commerce. Each one of these has some functions that are related to highway improvement, as have also the War Department and the Department of Labor. Road matters are vital enough to be handled by a separate department under a head who would be a member of the cabinet.

The matter is bound to come up in the not distant future, for roads are going to be of the utmost importance in the period of readjustment that we are entering. The whole subject is distinctly one for road builders; and bearing as it does upon the whole matter of reconstruction and readjustment, should be given prominence on the programs of coming conventions.

The Problem Before Us

By A. DENNIS WILLIAMS.*

In the United States there are approximately 2,150,000 mi. of public road in the 48 states and 3,014 counties. A system of roads, comprising less than 15% of this mileage, connecting all of the county seats and important towns, can be so located as to be within less than 2 mi. of 90% of the population of the United States.

Just think, this will comprise not over 300,000 mi. of road!

Considering that these 300,000 mi. of road are all to be constructed 18 ft. wide, the surface area would be 3,168,000,000 sq. yds. Figuring this at an average of \$2 per sq. yd. for surfacing, we would have the following:

Surfacing	\$6,336,000,000
Culverts and bridges, necessary to provide adequate drainage	900,000,000
Grading, ditching, marking, erecting guardrails, etc.	3,300,000,000
Engineering, administration, etc.	1,041,600,000
Total	\$11,577,600,000

To distribute this through a 20-year program would require an expenditure of \$578,880,000 per annum. This would be less than 2 ct. per day per capita, or approximately 7.5 ct. per day per family, if we use the basis of population as a unit of computation. These figures are based upon a fair cost of highway construction—but considered from an economical viewpoint. By proper organization and the utilization of various local materials these figures could be maintained and in some sections materially changed. But it is

not wisdom to consider the construction of highways that will not endure heavy motor traffic, for the cost of a highway system such as above suggested is incidental when we consider the maintenance charges and the revenue it will produce for the nation by increased efficiency of every person having anything to do with transportation.

The defense of this nation, now the garden and granary of the world; the future of democracy; and the fruits of civilization are dependent upon the happiness of the population, the environment of the homes. These in turn are all dependent upon the highway, or means of communication. A complete road system in the United States will be the bulwark of defense, the anchor of peace and the cornerstone of success.

Cities to Report to Government on Public Work

War Labor Policies Board Seeking Data for Guidance in Stabilizing Employment

The War Labor Policies Board is seeking from the principal cities of the country reports on the renewal of activity in public work. A copy of the letter in which the request is made follows:

"The amount of public works postponed on account of the war conditions is very large. If a considerable portion of these delayed public works are well under way during the transition period from war to peace they will greatly help in stabilizing employment and industry. The return of war workers into the essential industries of peace and the demobilization of our military forces can both be made more easily if the necessary public works of the municipalities of the United States are in full swing at that time.

"Therefore, the War Labor Policies Board suggests that your city immediately determine how much of its delayed public works it can and will undertake, and when the different portions of it will be begun.

"As soon as your preliminary plans are agreed upon the nearest office of the United States Employment Service will be anxious to receive approximate information concerning the number and kinds of workers needed for carrying out your plans.

"The aggregate of such information from all the municipalities of the United States will be of great value to the Government.

"After you have had time to make your decisions and plans, further inquiries through the Capital Issues Committee and the Department of Labor will be directed to you concerning them."

Illinois to Commence Road Work Under Bond Issue

Plans for 1919 Work Are Being Made By State Highway Authorities

The construction of approximately 1,000 mi. of the 5,000-mi. road system in Illinois, which it is proposed to build with the \$60,000,000 bond issue, will be undertaken next year, according to recent reports from that state.

State Superintendent of Highways S. E. Bradt has stated that the roads to receive first attention will probably be those connecting Chicago and St. Louis, St. Louis and Terre Haute, Chicago and Danville (Dixie Highway), Chicago and Fulton (Lincoln Highway), and the road from Chicago to the Wisconsin line.

It is stated that by July 1, 1920, there will be available \$10,000,000 of money, from federal, state and county sources, including funds from the \$60,000,000 bond issue voted at the recent election.

*Executive Chairman, West Virginia State Highway Commission. Acting Secretary, American Association of State Highway Officials.

Colorado Highway Commissioner Urges Additional Federal Aid*

Advocates Issuance of \$100,000,000 of Federal Bonds to Aid States in Road Improvement

It is apparent that the better roads question has arrived at the point where national consideration is demanded. New conditions have arisen, which, in my opinion make it the most important public matter to be considered. I am submitting herewith a few of my ideas on this subject.

Out in the West we have a great big country gradually evolving from barren waste to productiveness. There are millions of acres in the plains and prairie sections of these western states, over which are scattered thousands of successful farmers demonstrating beyond any question that 90% of these lands can be made into prosperous farm homes. And there are other millions of acres in the mountain valleys which can be reclaimed by irrigation, offering thousands of homes for the homeless. Opportunity is here awaiting better roads and publicity. These states are large in area and necessitate extensive systems of roads, including miles of expensive construction. We are handicapped by low valuations, which necessitate high taxes for road purposes, many communities taxing themselves as high as seven mills on each dollar valuation. All of these western states are preparing to increase their road funds by increased taxes and bond issues.

This whole nation is confronted by an emergency that should be temporarily provided for at once. An urgent demand for additional transportation facilities to move crops and goods has brought the motor truck with the power and ability to meet the situation if roads capable of sustaining the traffic are provided. We will be confronted in the immediate future with the necessity of providing labor with employment at good wages. These men who are now employed in the Government service cannot be turned loose without consideration. Our boys "over there," who will be home presently, must have every opportunity provided for employment of every character—business chances and land settlement. Good roads today are the most vital things in all our business relations. Why not ask the Government to furnish promptly, assistance, temporary in character, to care for the conditions confronting us, later working out a comprehensive national program of highway construction in conjunction with the states? Why not ask the present session of Congress to provide for an issue of \$100,000,000 4½% road bonds, 50% in 1919 and 50% in 1920, apportioned to the states on the basis used under the Federal Aid Road Act, each state's apportionment to be sold at par in the state receiving the allotment through its highway department, and paid into the state treasury to be credited to the state's road fund and expended under the supervision of the highway department in construction and improvement on the principal state highways in localities where such construction and improvement may be done to the best advantage?

Without a doubt every phase of the subject of transportation and roads will be discussed at the meeting of the American Association of State Highway Officials at Chicago in December, and I would like very much to see a resolution introduced urging Congressional action along the lines I have suggested, leaving out the "red tape" and permitting the state highway departments of the states to use the funds derived under the suggested plan to be expended promptly without the usual delays connected with governmental expenditures, because, in my

opinion, it is vitally necessary that employment be furnished labor.

Immediate action is imperative if we are to save our roads and meet the conditions confronting us. Congress is already grappling with the problem in a general way. Why not help your delegation in their work by presenting this plan to them with such modifications as may appear wise to you?

Snow Removal and Federal Requirements for Highway Transport

(Concluded from page 204)

ourselves to normal conditions of trade and communication in the quickest possible time.

I might add that our highways transport committees—with representation in every state, in every county and large center; consisting of a personnel of over 30,000 men—will interest themselves in the question of snow removal this winter, to effect the greatest utilization of our highways for essential transport operations.

We are in favor of the work you will undertake along similar lines and would like to see your work grow. And under the leadership of your experienced president we have no doubt it will grow. If our field organization can in any way assist or cooperate in any of your specialized efforts, we trust you will not hesitate to call upon us.

The 1919 Road Program of Multnomah County, Oregon

Plans Proposed By County Roadmaster Contemplate Expenditure of About \$725,000

Tentative estimates for road work in 1919 in Multnomah County, Oregon, call for an expenditure of \$725,467.50. This amount, it is stated, is \$200,000 in excess of the budget allowance for road work in 1918. The largest item is \$75,000 for the completion of the paving on Columbia Boulevard. Other large projects are: Riverside Drive, \$23,000; Pacific Highway, \$23,500, and Canyon Road, \$14,900.

The amounts allotted to the seven road districts of the county are as follows: District No. 1, \$118,937.50; district No. 2, \$22,600; district No. 3, \$75,930; district No. 4, \$150,200; district No. 5, \$44,350; district No. 6, \$31,100; district No. 7, \$18,000. The amounts allotted to the machinery account and to miscellaneous work are approximately \$39,000 and \$21,000, respectively.

Louisiana Road Expenditure in 1919

Over Four and a Half Million Will Be Expended in Record Year's Work

Road improvement in Louisiana in 1919 will involve an expenditure of \$4,674,000, according to estimates by State Highway Engineer Duncan Buie. This sum will be used for the construction of 753 mi. of highway and the maintenance of 470 mi. already completed. It will mark a record for one year's expenditure for road purposes, according to reports.

Bonds voted by parishes and road improvement districts amount to \$3,174,000. Parishes that have voted bonds for 1919 road work are: Caddo, Calcasieu, De Soto, East Baton Rouge, Iberia, Jefferson, Jefferson Davis, La Salle, Lafayette, Lafourche, Ouachita, Pointe Coupee, Grant, St. Tammany, Tangipahoa and West Carroll.

Federal expenditures in Louisiana next year will amount to \$1,500,000, it is stated. This will be used on 153 mi. of road, and will include much work that had to be stopped this year on account of the war.

*Copy of a letter from T. J. Erhart, State Highway Commissioner of Colorado, to Ira R. Browning, State Road Engineer of Utah.

Road Bond Plan for South Dakota

Good Roads Association Official Urges Adoption of Illinois Plan of Financing Highway Improvement

The adoption of the Illinois bond issue plan by the citizens of South Dakota has been advocated by E. C. Charnock, Secretary of the Minnehaha County Good Roads Association.

According to Mr. Charnock, South Dakota has approximately 100,000 automobiles, and a license fee of \$10 per car would, therefore, mean an income of \$1,000,000 per year. This, it is argued, would provide a sinking fund for a \$20,000,000 bond issue, maturing in 20 years, while the increase in the number of cars would provide revenue sufficient to take care of the interest.

Awarding of Pennsylvania Road Contracts Deferred Until Spring

Better Conditions and More Favorable Prices Looked for in the Spring, According to State Highway Commissioner O'Neil

Numerous telegrams and letters have been received by the Pennsylvania State Highway Department during the past few days requesting that contracts be awarded for the improvement of roads, permits for which had been withheld by the United States Highways Council, according to State Highway Commissioner O'Neil.

The department has worked out a definite system of roads, and contracts that were advertised and that were under consideration were for roads in this system. These, according to Commissioner O'Neil, will probably be the first to be undertaken when work is resumed.

"We have given the various requests our most careful consideration," Commissioner O'Neil says, "and in our opinion—owing to the lateness of the season and the fact that it is impossible to do road work during the winter months—we do not feel justified in making any awards or in advertising for proposals at this time, for it is thought that by spring much better conditions will prevail and prices will be much more favorable."

End of Priority Ratings and Restrictions on Non-War Building

War Industries Board Announces Revocation of All Priority Ratings and Removal of All Restrictions on Non-War Building Projects

The Priorities Division of the War Industries Board has announced the formal cancellation on all outstanding priority ratings, whether by certificate or automatic rating, with certain exceptions. The exceptions are: (1) orders placed by the U. S. Navy Department; (2) orders placed by the U. S. Shipping Board Emergency Fleet Corporation, and (3) orders placed by railroads, telegraph and telephone companies.

The board has also announced the removal on Nov. 21, of all remaining restrictions on non-war construction throughout the United States.

The revocation of priority ratings, which became effective Nov. 22, completely eliminates preference list No. 2 issued by the Priorities Division for the guidance of all governmental agencies and others interested in the production and supply of fuel and electric energy, the supply of labor, and the supply of transportation. It is announced, however, that the division will from time to time promulgate such rulings and make such suggestions and requests as changing conditions may require in connection with priorities in the

production and supply of fuel, electric energy, labor, and transportation.

The removal of restrictions on non-war building projects permits all building of whatever character that had been held up by the war to go forward. Permits will no longer be required from the War Industries Board, or from the state councils of defense.

Paving Plans in Chicago, Illinois

Over \$23,000,000 to Be Expended in Street and Bridge Work as the Result of Removal of Ban Upon Municipal Improvements

The removal of restrictions on municipal improvements will result in the undertaking of public improvements in the City of Chicago, Ill., involving millions of dollars, according to recent advices from that city.

Included in the proposed improvements are street and bridge projects that will cost at least \$23,000,000. These include the completion of Michigan Boulevard, involving the expenditure of \$6,000,000; the construction of new bridges in the downtown district, amounting to \$2,500,000; building the 12th St. viaduct, \$2,000,000; county roads, \$1,000,000; sanitary district bridges, \$1,500,000; and the Ogden Ave. extension, \$10,000,000.

Snow Removal on the Pennsylvania Section of the Lincoln Highway

Plans for Keeping the Road Open for Traffic During the Coming Winter Practically Completed by the State Highway Department

The Pennsylvania State Highway Department has practically completed plans for keeping open the Lincoln Highway during the coming winter, according to recent advices from Harrisburg.

A feature of the work will be the issuance of daily bulletins on the condition of the portions of the road in the mountains, similar information having been found of great value last winter. State Highway Commissioner O'Neil and Henry Pennywitt, Chairman of the Weather Bureau Office at Pittsburgh, have completed arrangements for the issuance of these bulletins. The highway department employees at Stoyestown, Bedford, McConnellsburg, Chambersburg, Gettysburg, and Ligonier will make daily telegraphic reports to the Weather Bureau office, and the bureau will then prepare and issue statements for the public.

A report prepared by Commissioner O'Neil at the request of Lieutenant Governor McClain, who is state consul for the Lincoln Highway Association, shows that during the past year 248 mi. of the road have received surface treatment; 22.5 mi. have been reconstructed, and 7 concrete bridges have been built. The total expenditure for resurfacing, reconstructing, bridge work and oiling was nearly \$750,000.

Public Improvements in Philadelphia, Pa., halted by the war, will now be rushed to completion, according to a report from that city. This action was decided upon at a recent conference between city officials and a committee appointed by the Councils.

Government Road Work is provided for in a bill recently introduced in Congress by Senator Chamberlain. Under the terms of the bill, the War Department is to take over, improve, construct and maintain a system of national and state highways for facilitating military operations.

Massachusetts Highway Association

OFFICERS FOR 1917-18

JOHN M. KEYES, President.....Concord
JOHN M. MCCARTHY, Secretary.....15 Ashburton Place, Boston
CHARLES A. BROWN, Treasurer.....Wellesley

Vice Presidents

ALBERT H. RHODES.....Worcester
WILLIAM J. GANNON.....Fitchburg

Directors

CHARLES J. BENNETT.....Hartford, Conn.
RICHARD A. JONES.....Waltham
HENRY A. SPATES.....Winchester
JOHN A. GAFFEY.....Medford

Announcement

This section of the paper is open to members of the Massachusetts Highway Association for the discussion of matters directly connected with road interests. Members are requested to submit items of interest for use in this column.

Address all communications to GOOD ROADS, P. O. Box 2705, Boston.

The regular quarterly meeting of the Massachusetts Highway Association was held at the American House, Boston, on Thursday, Nov. 14.

At the business meeting the following new members were elected: To active membership: Edw. J. Dumphy, Superintendent of Streets, Cambridge; R. L. Lingley, Assistant Street Commissioner, Worcester; Brenton W. Vaughan, Superintendent of Streets, Water and Sewers, Everett; Walter A. Wardwell, County Commissioner, Middlesex County, Cambridge. To associate membership: Edw. M. Shedd, Thomson Meter & Mfg. Co., Boston; James H. Shedd, Winchester Rock & Brick Co., Winchester.

President Keyes, presiding, appointed the following members to act as a nominating committee for the year 1919: Michael Driscoll, Jno. A. Williams, Asa P. Prichard, Jas. C. Blake, Jno. F. Clifford.

Dinner was served at 12:30 p. m., and the guest of honor was Mr. J. E. Pennybacker, Secretary, United States Highways Council. The speaker was introduced by President Keyes, and what he had to say was of great interest to the members present. Mr. Pennybacker explained that when he was invited to address the association on the future of road building under the regulations of the United States Highways Council, the country was in the midst of war, with no end in sight; but before the date of the meeting the sudden collapse of the enemy and the signing of the armistice had removed any necessity for explaining restrictive regulations that had even already been modified or entirely discontinued.

The speaker reviewed the work of the Highways Council and wished to emphasize the fact that the purpose of this board had always been to boost highway work rather than fight against it, and when applications for roads were refused, this action was taken in order to permit the construction of some more essential road work elsewhere, the materials available not being sufficient for all construction submitted for approval.

He pointed out that the council had stood between the highway interests and various Government departments, including the Oil Administration, the Railway Administration, the War Industries Board, the War Department and the United States Employment Bureau, and had acted for them in many ways that would have been impossible for the individual highway interests. Between seven and eight thousand requests for road construction were disallowed by the council. Of applications for 50,000,000 gal. of road

oil 3,304,000 gal. were disallowed, this amounted to about 6%; of applications for 56,000,000 gal. of road tars about 5.35% or 3,000,000 gal. were disallowed; of 184,000 tons of asphalt about 16.46% or 30,300 tons were disallowed; of applications for 5,000,000 bbl. of concrete 26.66% or 1,333,000 bbl. were disallowed; of applications for 113,000,000 paving brick about 24% or 27,000,000 were disallowed; of applications for 8,000,000 tons of structural steel about 75% or 6,000,000 tons were disallowed.

He explained that when the council was making decisions on applications that appeared unreasonable it was simply cutting work in one section to permit other and more important work to be done in another location.

He also predicted that, perhaps, within a few days all restrictions on road work would be removed and any disapprovals would be automatically revoked, but he believed that bond issues for large highway projects would still be regulated by the Capital Issues Committee. He also expressed the opinion that it was not unlikely that Congress would pass legislation towards the organization of a system of national highways, with large appropriations for carrying out the plan.

Commissioner Bates of the Vermont Highway Department spoke briefly. He explained that he came to the meeting to obtain information and he found out what he wanted to know from Mr. Pennybacker's remarks.

Commissioner Everett of New Hampshire said that he had also come for information, and was much pleased on account of the removal of restrictions. He stated that his department had greatly restricted all work during the past season, and work accomplished was hampered by the poor quality of labor obtainable.

Paul D. Sargent, Chief Engineer of the Maine State Highway Commission, expressed his pleasure at the prospect of the immediate removal of Government regulations, principally on account of the considerable amount of work that he would be saved in obtaining the advance information covering highway work for 1919, as recently required by the Highways Council.

Of the requests that he had sent out to cities and towns in his state only about 25% of replies had been received and of this number not more than 5% gave any of the detailed information required on the blanks. He cited several instances where peculiar conditions had arisen during the season in connection with competitive bidding on highway work. On one road there were three bidders. Two of them were about 100% over the engineer's estimate, and one was 10% under the estimate. The low bidder was given the contract and he completed the work without loss. In another case a road was advertised twice on account of high figures. The bids amounted to about \$100,000, and the department then decided to do the work on a percentage basis. The work is now about one-third completed, and has cost about \$31,000, so that the apparently high bids were as a matter of fact quite reasonable.

Mr. Sargent gave some very interesting facts and figures in connection with his efforts to stabilize his force of repair patrolmen. The plan he put in operation was to retain 10% of each man's monthly pay until the end of the season, this 10% being in effect a bonus in addition to the regular pay, the man to receive it only in event of his remaining on his job for the specified time. Results show that out of over 300 men working under this arrangement only 15 quit. This, of course, does not count the men who left to take part in the war.

Colonel Sohier expressed the hope that labor and other conditions would improve. The labor problem is the most serious, not so much on account of scarcity and high wages, but on account of the poor quality, and his observations led him to believe that it now, in many instances, required from three to four laborers to accomplish what one man would have been expected to do. He also believed that there is a further need for some authority to have the power to regulate road work after the Highways Council discontinues its control. He expressed the opinion that cities and towns might be required to repair or reconstruct main through lines of road before they were allowed to spend large sums constructing expensive pavements in strictly residential sections, while the important thoroughfares were neglected, and some cases in almost impassable condition. He gave the small towns credit for having accomplished 300% more work toward the improvement of trunk lines within their boundaries than the larger cities have on the sections of through road under their control. He also stated that he believed that the state highways were now in better condition than ever before.

Francis H. Kendall, Engineer of Middlesex County, spoke on the activities of his board in improving over 200 mi. of road under the law giving the counties a share in the automobile fees.

Louis K. Rourke, just back from Chili, gave an interesting account of his work in connection with the development of the largest copper mine in the world.

Mayor Stacy, of Springfield, expressed the pleasure that he had had at previous association meetings and in an-

nouncing that he had declined to run again, paid a very high compliment to Arthur A. Adams, a past president of the M. H. A., and now Republican nominee for the Springfield mayoralty to succeed Mayor Stacy.

Arthur A. Adams spoke briefly and suggested that efficient service as superintendent of streets was a good recommendation for a higher office, and in all of the campaign notices, the fact that he had been in charge of Springfield's streets for eleven years was always referred to in large type.

Jonas A. Laraway, chairman of the Winchester selectmen, was next introduced, and, although a stranger to most of the members, he made an instantaneous hit. He expressed regret at all of the difficulties that attended the construction and maintenance of roads during war times. As he put it, there was "no labor, no materials, no grease for the roads, and always one damn thing after another." He referred to the necessity of hiring four men to care for fifteen town horses, and said that he "had done more work for his board when he was fourteen years old, and even then his landlady thought she was mighty generous."

Mr. Rhodes offered a motion that referred to the letting of contracts in the City of Boston, and this matter will be covered at length in our next issue.

A special meeting of the Massachusetts Highway Association will be held on Dec. 19. This will be the silver anniversary (25 years) of the association, and a big time is being planned. Everyone come!

New Hampshire Good Roads Association

OFFICERS FOR 1918

CHARLES A. FRENCH, President.....	Laconia
F. E. EVERETT, First Vice President.....	Concord
W. M. CHAPLIN, Second Vice President.....	Keene
GEORGE P. WINN, Secretary and Treasurer.....	Nashua

Board of Directors

O. F. WINSLOW.....	Nashua
C. M. BROOKS.....	Keene
H. L. SMITH.....	Lakeport
ALFRED CLARK.....	Concord

City Engineer Charles A. French has been commissioned a captain in the Construction Department of the United States Engineer Corps, and will report for duty in a few days. Captain French has been at the head of Laconia's street and sewer department since 1906, and is considered one of the most successful highway constructors in New England, as it is a fact that Laconia's pavements, constructed under his direction, have been built at a lower cost than in almost any other section of New England, and have stood up better and required a smaller expenditure for upkeep than in other cities. Laconia's tar macadam and cobblestone concrete, of which there are many miles, have practically all been constructed under City Engineer French's management, and it is a fact that when he came to Laconia the streets were almost without exception thoroughly bad, while at the present time tourists who have traveled extensively throughout this section of the United States quite generally agree that there are but few cities of Laconia's population and wealth that can match her for well paved streets and sidewalks.

He is now Chief Officer of Utilities at the base hospital for gassed soldiers who have contracted tuberculosis, located at Camp Azalea, N. C. There are said to be 10,000 of these soldiers in camp at the present time. Capt. French's family is to join him at Camp Azalea the latter part of November.

The Laconia Board of Public Works has granted Capt. French a leave of absence while he is in the service of Uncle Sam.

Preparations are being made for one of the best meetings of the Good Roads Association to be held on Dec. 12, 1918, in the Assembly, City Hall, Nashua. It is hoped to obtain some of the best known road authorities for speakers.

The city laborers in Nashua are receiving \$3.50 per day and the teamsters are receiving \$3.75 per day. This is an increase of \$1.00 since January, 1918.

Nashua contemplates maintenance only of its roads next year.

The City of Concord has purchased an International 1-ton truck and a Concord 2½-ton dump body truck. These trucks are for the use of the Highway Department.

The city laborers in Concord are now getting \$3.45 per day; this is an increase of 93 ct. since April 1, 1918.

Two inches of snow have already been recorded in Lebanon.

Mr. Charles, Mr. Knapp and Mr. Wells, inside men of the State Engineering force, were victims of the influenza epidemic, but all are now back at work.

A raise in pay for city laborers is probably forthcoming in Manchester. The request of the commissioners of Board of Public Works for an increase for all the men they employ has been received by Mayor Moise Verette. The mayor is in favor of the salary increases. The question now is whether or not the city's bank account can stand the strain of the extra expense of carrying on the department.

The laborers are now receiving 38 ct. an hour. They ask for 44 ct. an hour.

The Merrimac Valley Road from Nashua to the Massachusetts line measures 3½ mi. The road is built of Topeka mixture, and the contractors were Winslow & Co., of Nashua, N. H.

New York State Road Builders' Association

OFFICERS

JOHN H. GORDON, President.....Albany
C. J. HENDRICKSON, Vice President.....Syracuse
WILLIAM G. FOX, Treasurer.....Saratoga

Trustees

W. A. GREENFIELD.....Hornell
T. H. GILL.....Boston, Mass.
FRED E. ELLIS.....Melrose, Mass.
W. T. THAYER.....Chateaugay
JOSEPH WALKER.....Albany
S. B. VAN WAGENEN.....Rondout

Legislative Committee

FRANK G. FOWLER, Chairman.....Mt. Kisco
JOHN B. DOWER.....Ballston Spa
H. B. HARRISON.....Buffalo
W. T. THAYER.....Chateaugay
N. E. YOUNG.....Binghamton

Membership Committee

RICHARD HOPKINS, Chairman.....Troy
FRED E. ELLIS.....Melrose, Mass.
W. A. GREENFIELD.....Hornell
C. J. HENDRICKSON.....Syracuse
J. F. PADDELFORD.....Sherburne

Clarence E. Weed, Albany, N. Y., a well known road contractor and a member of the New York State Road Builders' Association, is also doing his bit at Hog Island, Pa.

Nathan E. Young, Union, N. Y., is completing the work on the repair contract job in Broome County, which was originally let to the Sherman Contracting Co. of Oneonta, N. Y., on May 1, 1917.

Chas. R. Allen, Jr., Saratoga Springs, N. Y., who for a number of years was assistant engineer in the New York State Highway Department, is at present employed in the Material Engineering Department at Hog Island, Pa.

Dana W. Robbins, of Utica, N. Y., but more recently of New York City, visited Albany recently. While highway business was primarily the object of his sojourn, he found time to expatiate in an interesting manner on art, poetry and the gastronomic peculiarities of some specimens of the "genus homo."

Joseph T. Murphy, Assistant Engineer in the testing laboratory of the State Engineer's office, died recently of influenza. He contracted cold attending the funeral of his brother, Dr. Raymond A. Murphy, who was a victim of the same disease. Both gentlemen were residents of Albany, N. Y.

Because the work has not progressed satisfactorily, the contracts which were awarded to the firm of Gleason & Davitt for the improving of several streets in Albany, N. Y., have been annulled. It is expected that the Fidelity & Deposit Company of Maryland will get a contractor to complete the work.

A. D. Bridges' Sons Co., Inc., of Hazardville, Conn., member of the New York State Road Builders' Association, has the contract for 10.5 mi. of federal aid road work at Bowdoinham, Me., on the main road from Portland to Augusta.

About 7 mi. are completed at the present time, and this fall will find its entire completion with the exception of about 1 mi. This same contracting firm has another job at Auburn, Me., on the road from Lewiston to Portland. This, Mr. Bridges does not expect to quite finish this season.

The Greenfield Construction Company, Hornell, N. Y., with Mr. F. A. McKibben, treasurer of the company, in charge, expects to complete the state highway between Canandaigua and Geneva, Ontario County, N. Y., this fall. This road is part of the Buffalo-Albany Turnpike, and is being resurfaced with concrete. It is one of the earliest state roads built in New York, and was originally water-bound macadam, but has been resurfaced several times. Large convoys of army and commercial trucks pass over this road, and it is absolutely necessary that the road be in good condition on account of its commercial use. There is also heavy local tourist and local traffic, such as would be expected in a thickly populated and wealthy state.

There is no parallel road to which traffic can be diverted during the work, but surprisingly little delay and inconvenience in traffic have been caused.

The Association for the Protection of the Adirondacks, which is most conservative in its attitude toward any relaxation of the restrictions against the cutting of trees in the state forest reserve, approves of the amendment to the state constitution, which provides that the state be privileged to construct a state highway from Saranac Lake in Franklin County, to Long Lake in Hamilton County, and thence to Old Forge in Herkimer County, by way of Blue Mountain Lake and Raquette Lake, because it involves the destruction of comparatively few trees. At present the only way of entering this part of the state on good roads is from the Albany district by way of Lake George, or from the northern district by way of Plattsburgh and Malone. A good road runs from Utica north to Old Forge, but from Old Forge north there is no way of again reaching the road which runs up from Albany. Between Old Forge and Long Lake lies a 12-mi. stretch of the forest reserve, and the Attorney General has construed the present law as preventing the state from constructing a road on its own land. As the law was inserted in the constitution before the good roads movement was begun in the state, the amendment was found necessary.

The Attorney General's Department of Pennsylvania recently brought 20 suits against boroughs and townships for the recovery of money alleged to be due the State Highway Department. The funds involved are the borough's and township's shares of expenditures for highway construction and maintenance. The suits are said to be the first of a large number that will be brought as a result of a recent Supreme Court decision in what is known as the Adams County case.

MEETINGS

Calendar of Coming Meetings

Dec. 5-6.—Washington State Good Roads Association.—Annual Convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Dec. 9-13.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Dec. 11-13.—Highway Industries Association.—Convention, Chicago, Ill. Secretary, Henry G. Shirley, 302 Maryland Building, Washington, D. C.

Feb. 25-28, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

Chamber of Commerce of the United States

A "war emergency and reconstruction conference" of war service committees of the United States is to be held under the auspices of the chamber of commerce of the United States at Atlantic City, N. J., on Dec. 4, 5 and 6.

Reconstruction problems will be the chief subjects of discussion at the conference. There will be four general sessions—one on the morning of Dec. 4; one on the afternoon of the same day; one on the morning of the 5th, and one on the morning of the 6th. At three sessions the conference will be divided into groups for the consideration of special subjects. Group meetings will be held on the evening of Dec. 4, the afternoon of Dec. 5 and the evening of Dec. 5. On the evening of Dec. 4, each war service committee will meet with its chairman to consider the problems in its particular field, and on the afternoon of Dec. 5 the war service committees will meet in groups that are related as to their use of material, their distribution problems and the like.

Road work is expected to have a place on the program, road machinery manufacturers having a war service committee consisting of W. R. Wilson, chairman; S. T. Henry, secretary; S. F. Beatty; Roy E. Adams, and C. O. Wold.

Motor Transportation Conference

A conference on motor transportation was held during the week ending Saturday, Nov. 23, under the auspices of the Colt-Stratton Co., motor vehicle distributors, at their sales-rooms in New York City. The conference consisted of a series of evening meetings, at which addresses were made by men prominent in the field covered, each address being followed by open discussion. The meetings were well attended and it is said that as a result of their success it has been decided to hold similar conferences semi-annually.

Among those who spoke at the meetings were: Arthur H. Blanchard, President of the American Road Builders' Association and of the National Highway Traffic Association; Fourth Assistant Post Master General Jas. I. Blakslee; Henry G. Shirley, Secretary of the Highway Industries Association; A. G. Batchelder, Chairman of the Executive Board of the American Automobile Association; Inspector O'Brien of the New York Police Department; T. D. Pratt, Executive Secretary of the Motor Truck Association of America; S. W. Taylor, President of the "Rider and Driver," and H. S. Quine, of the Goodyear Tire and Rubber Co.

Washington State Good Roads Association

The annual convention of the Washington State Good Roads Association, which was to have been held at Pasco, Nov. 21-22, has been postponed to Thursday and Friday, Dec. 5-6. The postponement of the meeting was due to the influenza epidemic.

New Jersey Association of County Engineers

A meeting of the chairmen of the sub-committees of the Specification Committee of the New Jersey Association of County Engineers was held at the county court house at Trenton, N. J., on Nov. 15. These sub-committees were appointed at a meeting of the association on June 21 and 22, as noted in "Good Roads" for June 29 and July 6.

Those who took part in the conference were Fred. A. Reimer, County Engineer of Essex County, chairman of the Specification Committee; J. J. Albertson, County Engineer of Camden County, chairman of the sub-committee on details; A. H. Nelson, County Engineer of Atlantic County, member of the sub-committee on legal clauses; H. F. Harris, County Engineer of Mercer County, chairman of the sub-committee on bituminous paving; T. J. Wasser, County Engineer of Hudson County, chairman of the sub-committee on block paving; L. M. Rice, County Engineer of Cape May County, chairman of the sub-committee on gravel and shell; Garwood Ferguson, County Engineer of Passaic County, chairman of the sub-committee on concrete roads, and R. S. McClave, County Engineer of Bergen County, chairman of the sub-committee on arrangement and general clauses.

The Society of Automotive Engineers will hold a meeting at New York, N. Y., on Jan. 12, 13 and 14. The technical sessions will be devoted to the discussion of problems encountered during the war and to the problems to be solved during the reconstruction period. A "victory dinner" will be held at the Hotel Astor during the convention.

PERSONAL MENTION

Walter H. Taylor has been appointed director of public works of Norfolk, Va.

Geo. F. Baker, Bridge Engineer of the City Engineering Department of Dayton, Ohio, has been commissioned a lieutenant and assigned to duty at Camp Humphreys, Va.

William C. Beuscher has been appointed to the staff of the county engineer of Hudson County, N. J. Mr. Beuscher was formerly city engineer of West New York, N. J.

E. G. Willemin, a resident engineer of the Michigan State Highway Department, has been commissioned a first lieutenant in the Corp of Engineers and assigned to duty at Camp Humphreys, Va.

Thos. B. Dunn, of Rochester, N. Y., member of Congress from the 45th district, will be ranking Republican member of the roads committee of the House of Representatives when the new Congress assembles, according to the American Automobile Association. It is expected that if the Republicans control the house, Mr. Dunn will become chairman of the committee.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, DECEMBER 7, 1918

Number
23

Superelevation of Highway Curves

Design of Cross-Section of Pavements on Curves and Formula for Safe Speeds
on Curves of Varying Degrees

By R. A. MEEKER*

The speed of motor-driven vehicles averaging five times that of horse-drawn, it becomes necessary to so design the cross-section of our roads as to create sufficient centripetal force, or that force which holds a body in a circular path by pulling or pushing it toward the center, to overcome the centrifugal force tending to cause the vehicle to take a path tangent to the curve. The moment the stress or tension of this centrifugal force exceeds the adhesive force between the tire and the road surface the car skids, and to overcome this tendency and keep the car on the road it is necessary to elevate the outer side of the pavement. This modification of the usual curvature of the cross-section is termed superelevation.

Care should be exercised not to carry the highest point beyond three-quarters of the width of the roadway from the lower side. This precaution is necessary for two reasons: First, to prevent washing or scouring of the road by an overflow of water from the upper gutter; and, second, the convenience of the traveling public in crossing the road, particularly if the curve is located at a road intersection.

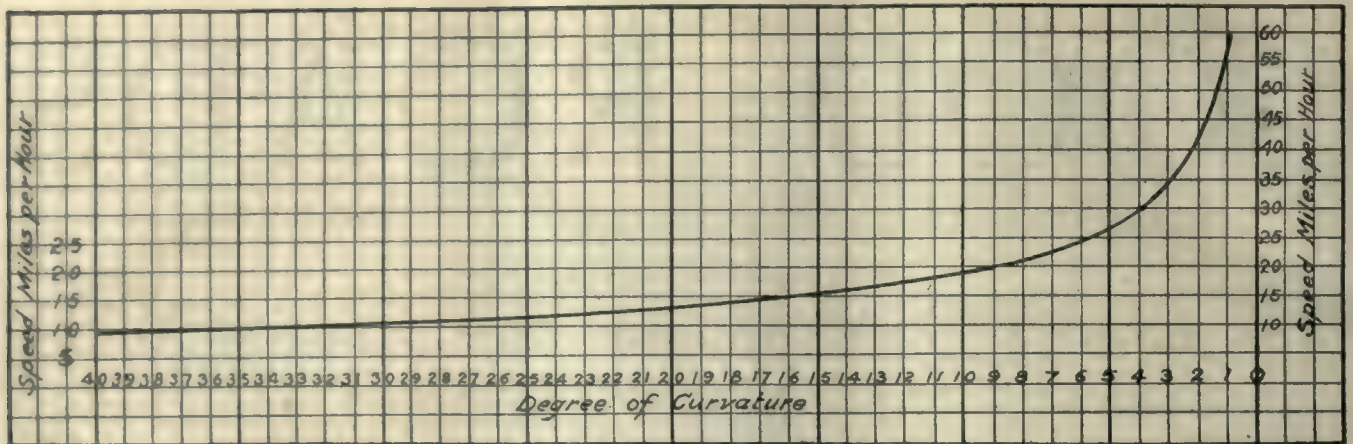
For both of these reasons the amount of superelevation should not exceed 9 in. (.75 ft.) on a pavement 18 ft. wide on the tangents.

Taking .75 ft. as a standard superelevation, the maximum speed in rounding a curve of 100 ft. radius should not exceed 7.9 mi. per hour. This deduction is based upon the formula:

*Former State Highway Engineer of New Jersey.



SUPERELEVATED CURVE ON A NEW JERSEY HIGHWAY



CURVE SHOWING SAFE SPEEDS ON CURVES OF VARYING DEGREES.

$$W V^2 = E g R$$

in which,

W = Width of pavement,

V = The speed in feet per second,

E = The elevation of the highest portion of the pavement above its inner edge,

g = the acceleration of gravity per second (32.2 ft.),

R = The radius of the curve in feet.

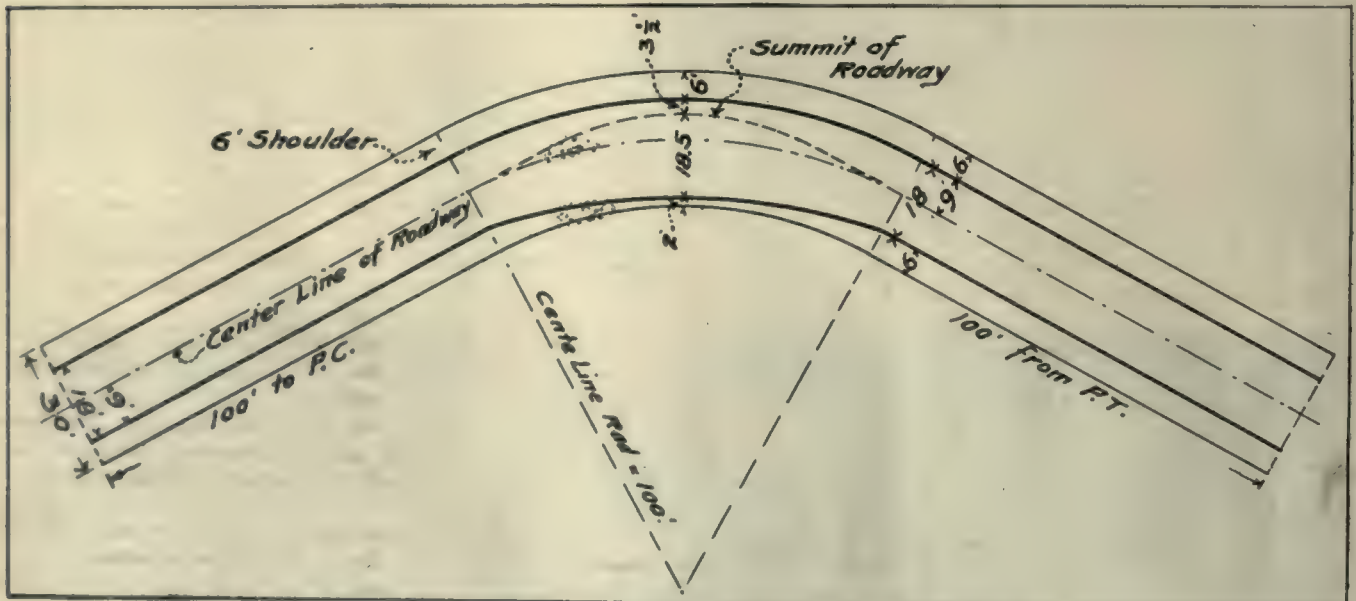
Then for a pavement 18 ft. wide the superelevation of which is .75 ft. on a curve of 100 ft. radius, the equation becomes, by substitution:

$$18 V^2 = (.75) (32.2) (100)$$

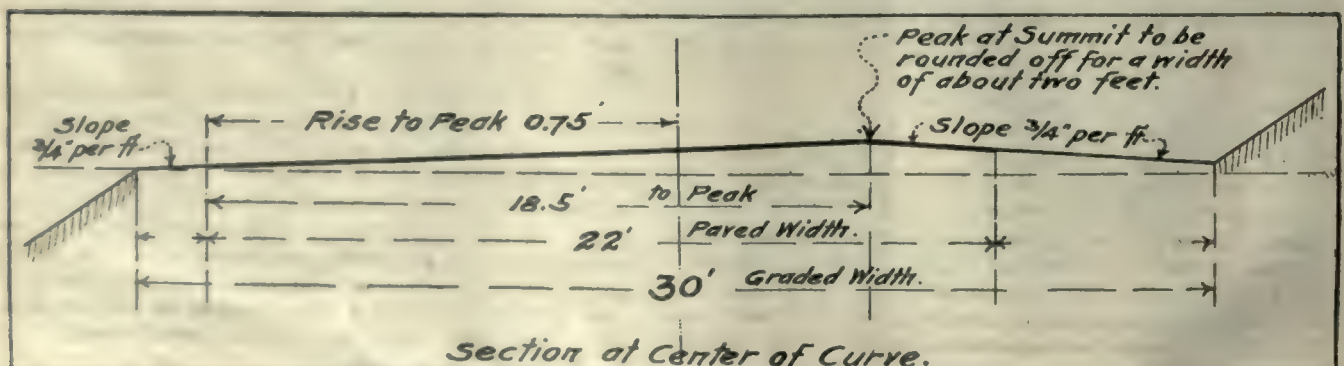
and solving:

$$V = 11.583 \text{ ft. per second} = 7.9 \text{ mi. per hour.}$$

The safe speed at which a curve may be traveled increases very uniformly from 7.9 mi. per hour on a curve of 100 ft. radius up to 18.9 mi. per hour on a 10-deg. curve, and thence to 30 mi. per hour on a 4-deg. curve. From this, the safe speed, so far as centrifugal force is concerned, increases rapidly up to 60 mi. per hour on a 1-deg. curve, as indicated



PLAN OF CURVE, SHOWING TREATMENT OF CENTER AND SIDE LINES OF ROAD.



CROSS-SECTION OF ROADWAY ON SUPERELEVATED CURVE

on one of the accompanying charts and in the accompanying table.

TABLE SHOWING SAFE SPEEDS IN MILES PER HOUR AT WHICH CURVES OF DIFFERENT DEGREES MAY BE TRAVERSED WHEN SUPERELEVATION IS 0.75 FT. ON A PAVEMENT 18 FT. WIDE.

Degree of curve	Speed, miles per hour.
56	8.01
52	8.28
48	8.61
44	9.05
40	9.44
36	10.00
32	10.56
28	11.28
24	12.27
20	13.33
18	14.10
16	15.00
14	16.00
12	17.26
10	18.86
9	20.00
8	21.13
7	22.58
6	24.00
5	26.30
4	29.89
3	34.40
2	42.27
1	60.00

The second factor, the convenience of the traveling public, requires that the pavement slope downward for a width

of at least 2 ft. from the highest point towards the gutter on the outside of the curve. This serves not only to avoid a sudden jar on leaving the edge of the pavement, but also acts as a protection to the pavement itself by removing an exposed sharp edge.

Longitudinally, the superelevation should increase uniformly from the point of curvature to the middle of the curve, then decrease in the same manner to the point of tangency.

Transversely, the slope of the cross-section should increase by equal gradations from that normal on the tangents to the vertex of the curve, at the same time carrying the crown of the pavement from the center toward the outer edge and also widening the pavement by the construction of a lune on both sides beginning at the point of tangency and increasing to a minimum of 2 ft. at the vertex. This provides for an extra width on the inside of the curve to catch the wheels, as the tendency in rounding a curve is always to crowd towards the inside. The lune on the outside should slope downward at a 50% sharper rate, thus forming a chamfer for the upper edge. This rate must be continued to the outer gutter line.

The cross-section at the vertex of the curve is shown in one of the accompanying illustrations.

If the curve is very sharp the widening of the pavement on the inside should be carried to the gutter line.

Where Lies the Burden of Highway Transportation?

By ROBERT C. BARNETT*

Because of the publicity that has been given the matter of late years, much attention has been centered on the subject of good roads. With many, this has produced an obscuring of vision and an overshadowing of the real end sought, viz., highway transportation. It needs but little thought to see that a road in itself produces nothing. There must be completing elements—vehicle and motive power—before transportation is accomplished. We are, therefore, primarily interested in the production of transportation, hence our attention should first be centered on the end sought, rather than on any one of its constituent elements. The real objective is the securing of economic transportation. To attain this desideratum, there must be had a proper adjustment of the elements in their relations to each other.

The basic elements of highway transportation are: 1, Roadbed; 2, Vehicles; 3, Motive power.

Each element is but a means toward an end and not the end itself. This seems elementary and obvious, and yet because these three elements usually do not come under one and the same ownership, this fundamental condition is overlooked. It is not uncommon to find good roads advocates, highway commissioners, engineers, and road builders taking the attitude that the roadbed is the thing to be achieved; therefore, let the users of the road shift for themselves. On the other hand, there are users who seek to use a roadway regardless of the kind of traffic for which it was designed. These partial and opposing views find their reconciliation through submergence in the larger view that the end sought is economic transportation. This broader view is needed in order to avoid loose thinking and faulty conclusions. Economic transportation means the production

of a unit of transportation at the least cost, or, in other words—the lowest cost per ton-mile is the desideratum.

What, then, is the proper adjustment or relation among these three elements that will secure the end desired? As yet, owing to the paucity of data, this question can be answered only in general terms, as follows.

(a.) The roadway should be designed and built to fit the traffic it has to carry—the annual tonnage and intensity of wheel loading being considered.

(b.) The vehicles should be of such capacity and number that, working regularly and continuously, they can carry the given tonnage over the required distance in the allotted time.

(c.) The motive power must be sufficient and only sufficient to move the vehicles on the proper schedule.

A more specific answer to this question can be worked out as the necessary data are accumulated. It is highly desirable that this should be done as early as possible in order that a better adjustment of these basic elements with each other may be had and thus the present-day waste be eliminated.

This waste occurs in several forms. There is the waste of power due to traversing bad roads—bad not only in the condition of pavement or lack of it, but bad also in the way of steep grades and poor alignment. There is also a waste caused by the extra amount of wear on tires, vehicles, and power equipment due to lack of pavement, or to pavement of improper kind, or insufficiently maintained. On the other hand, there is an excess wear on the roadbed due to fast moving vehicles, or to a large number of vehicles following in the same track, or to heavy wheel concentrations. One form of waste affects the annual cost of roadbed and another form the annual cost of operation. To reduce this

*Economic Engineer, Missouri Highways Transport Committee.

waste on the one hand means an increased investment on the other hand.

To give a general idea of the relative magnitudes of the annual cost of roadbed and the annual cost of operation, the accompanying chart has been prepared. It is based upon a series of computations involving the following factors:

- | | | |
|--|--|---|
| <p>I. Annual cost of roadbed</p> <p>II. Annual cost of operation</p> | <p>1. Interest on first cost</p> <p>2. Maintenance.</p> <p>3. Administration (or overhead).</p> <p>4. Amortization of wearing surface of pavement.</p> <p>1. Interest on power equipment and vehicle.</p> <p>2. Licenses and taxes.</p> <p>3. Insurance.</p> <p>4. Administration (or overhead).</p> <p>5. Gasoline.</p> <p>6. Oil, grease and waste.</p> <p>7. Driver's salary.</p> <p>8. Maintenance (tire renewals and repairs).</p> <p>9. Amortization.</p> | <p>1. Right of way.</p> <p>2. Clearing and grubbing.</p> <p>3. Grading.</p> <p>4. Paving.</p> <p>5. Culverts and drainage ditches.</p> <p>6. Signs, markers, fences, etc.</p> <p>7. Engineering and legal expenses.</p> |
|--|--|---|

As the costs of these various items fluctuate from time to time and with different localities it seems hardly worth

while to present the detailed computations. However, the variations are not sufficient to disturb greatly the general relation between annual cost of roadbed and annual cost of operation.

Experience shows that there is an inter-relation between some of the factors of one group and those of the other, such that a decrease in one group is usually followed by an increase in the other, but not necessarily to the same extent. To make the sum total of the two groups a minimum, requires a nice balancing of all the factors. It is beyond the scope of this article, however, to discuss this balancing, as the immediate purpose is to show something of the distribution of the burden incurred in highway transportation activity.

A study of the chart will disclose the relation between total annual cost and traffic density, and also that between annual cost of roadbed and cost of operation for different densities of traffic. The upper sloping lines represent the total annual costs for the respective types of pavement selected. The lower group of lines shows the annual cost of roadbed, for which costs of maintenance has been estimated for several different traffic densities. The vertical distance between the lower sloping line and its corresponding upper sloping line marks the annual cost of operation. It should be noticed that when the traffic reaches a density of about 50 tons per diem the annual cost of operation passes in amount the annual cost of roadbed.

This means that the users as a class have a greater burden to bear than the organization providing the roadway. For this reason the users have a greater interest at stake and are, therefore, properly entitled to receive the greater

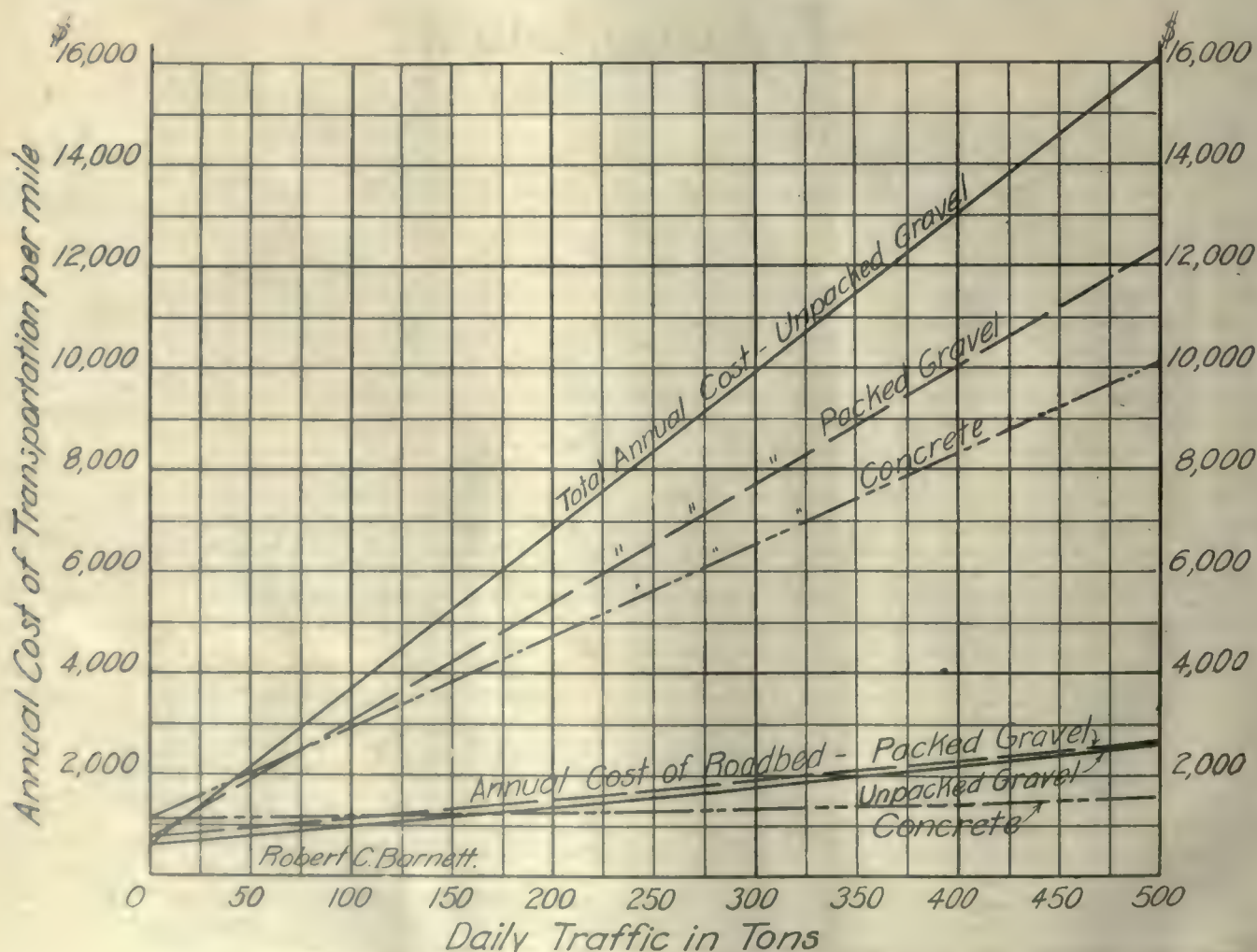


CHART SHOWING COMPARATIVE ANNUAL COSTS OF ROADS.

consideration. Owing to the fact that the users are poorly organized, if at all, and are, therefore, unable to present in convincing form, backed by quantitative data, their side of the case, scant attention has been given to the cost of operating over a given road and to how that cost might be reduced. The securing of greater economy in highway transportation will depend largely upon the organized efforts of the users to impress legislatures and highway commissioners with the possibilities of reducing transportation costs by proper coordination of the elements of highway transportation.

Street Cleaning in Philadelphia

Civic Organizations Plan to Seek Legislative Authority for City To Do Its Own Work

Various civic organizations of Philadelphia, Penn., are advocating legislation to revise the city's charter so as to permit the city to own and operate street cleaning facilities. A legislative committee will be organized at a conference to be held on Dec. 10.

At a public meeting held on Nov. 25, under the auspices of the Chamber of Commerce, the determination to take this step was reached. A committee appointed to investigate the matter reported in part, as follows:

The committee deplores the fact that the "first item", according to Director Datesman, which controlled the preparation of the 1919 specifications, was the injunction by the financiers of the city to keep down the cost of the maintenance contracts as far as possible. In other words, the street cleaning was to be so specified that the amount expended for street cleaning would fall within the limit of the city budget.

The committee believes that no such limit should be set; that clean streets should be obtained no matter what the cost; that the specifications should have been prepared from only one point of view, namely, to provide a thoroughly clean, sanitary city.

As regards the two specifications, it was apparent at the outset that the 1919 street cleaning specifications were made having in mind a different principle from that which was deemed of vital importance in the specifications of the last four or five years.

In the specifications immediately preceding the 1919 specifications it was believed that the more specific the terms, the more direct the requirements, the more particular they were in specifying men, appliances, etc., the better would be the street cleaning.

In the 1919 specifications the requirement of a minimum number of men to do the work in each district was omitted. While the contractor receiving the award was to be held responsible for the complete cleaning of the streets the number of men was left to his judgment and not subject to any other conditions.

The committee views with apprehension his change of principle. If, under the previous year, with specifications requiring about 1,300 men, the streets were not satisfactory to most of the citizens, it is apparent that with no minimum number of men required, conditions could not be otherwise than worse than the previous year.

This point of the minimum number of men required to do the work was deemed the high spot in the variances between the 1918 and 1919 specifications. There were many other variances in smaller details, all of which are covered by the one thought, that the specifications were less specific and gave more latitude for lax conditions.

In its deliberations, the committee received the advice and counsel of former Chief of Highways William H. Connell, who, while reluctant to enter into an apparent controversy of this sort, felt it his public duty as a citizen to give the committee the benefit of his expert engineering knowledge.

Mr. Connell stated unqualifiedly that the 1919 specifications were a backward step, and that the teeth had been drawn from the specifications partially in 1918 and fully in 1919. In a letter addressed to the committee Mr. Connell stated that Philadelphia was one of the few cities in this country, in fact in the world, which did its street cleaning through a contract system.

After discussing the matter at some length the following resolution was adopted:

Resolved, That it is the sense of this meeting that Philadel-

phia is entitled to and now asks from the next state Legislature, as a measure offering home rule, an act granting authority to do her own street cleaning and contracting, substantially as prepared and advocated by the Philadelphia Charter Revision Committee of 1917 and introduced as House Bill No. 771 (Beyer) in the 1917 Legislature.

Federal Aid Expenditures in 1918

Amount Spent Was \$425,445 Out of a Total of \$14,550,000 Available

Although the sum of \$14,550,000 was available for expenditure in federal aid, only \$425,445 was paid out during the construction season of 1918, according to a recent statement from the Department of Agriculture.

This, of course, was due to the restrictive measures inaugurated by the Government in order to conserve money, labor, transportation and materials. What funds were used were applied to those projects regarded by the federal officials as of the greatest importance from a "win the war" standpoint.

Jersey Counties Plan Winter Work

Snow Removal on County Roads and Traffic Routes Through Newark Discussed by Officials

Plans for keeping county roads clear of snow, and for routing traffic through Newark have been discussed at recent meetings of New Jersey county officials and others interested.

According to the plans made for snow removal, many thoroughfares will be cleared of all but 3 in. of snow. Appropriations for the work will be made by the county authorities, and extensive use will be made of motor trucks and other equipment.

The designation of routes through the city of Newark is intended to prevent congestion in that city by diverting through truck traffic from the busier parts. It was thought that an extensive traffic survey of the city might be necessary, and the matter is being taken up with city, and county officials, motor truck and automobile interests, manufacturers, and other interests.

Road Work in Oakland County, Michigan

Issuance of \$250,000 in Bonds and New Method of Administration Included in Proposed Program

The issuance of bonds amounting to \$250,000 for the construction of roads in 1919 has been taken up by the officials of Oakland County, Michigan, and the Capital Issues Committee. The proposed issue of bonds would be the fourth and last instalment of an issue of \$1,000,000 approved three years ago.

If issuing the bonds at this time is approved by the Capital Issues Committee, the funds will be used on nine important projects. Among the roads to be improved are Auburn Ave., the Franklin Road, the Ortonville and Clarkston Roads, the Grand River Road, Baldwin Ave., and the Davisburg Road.

There is also under discussion a plan to change the administrative organization of the county by the appointment of an engineer to handle the work under the general direction of an advisory committee of non-paid members. It is believed by the supporters of the plan that this will result in better work than can be obtained under the present method of having work done by elected officers.

State Highway Officials and Highway Industries Associations to Meet at Chicago, Illinois

Historical and Descriptive Sketches of the American Association of State Highway Officials and the Highway Industries Association—Personnel of the Officers and Committees—Program of the Chicago Convention

Conventions of the American Association of State Highway Officials and the Highway Industries Association will be held at Chicago, Ill., on Monday, Tuesday, Wednesday, Thursday and Friday of next week, Dec. 9 to 13, inclusive. Each organization will have separate sessions and the two will hold joint open sessions on two days.

The American Association of State Highway Officials will meet at the Hotel La Salle, holding sessions, open only to members and those eligible to membership, on Monday forenoon and afternoon, on Tuesday forenoon and afternoon, and on Friday forenoon and afternoon. On Monday evening there will be a meeting open to the public and on Tuesday evening there will be an informal dinner for the members.

The Highway Industries Association will hold an open meeting on Friday forenoon and an executive session on Friday afternoon. Both meetings will be held at the Congress Hotel.

Joint sessions of the two organizations will be held at the Congress Hotel on Wednesday forenoon, afternoon and evening, and on Thursday forenoon and afternoon. The evening of Thursday will be devoted by both associations to committee meetings. The program in full is printed on other pages.

The American Association of State Highway Officials, as its name implies, is an organization of men occupying official positions in the highway departments of the several states. The Highway Industries Association is made up of representatives of the various industries concerned with the construction and use of roads. Brief sketches of both associations follow.

American Association of State Highway Officials

The American Association of State Highway Officials is an organization of officials, engineers and others holding responsible positions in the highway departments of the several states, and in the Federal Government.

Its purposes as defined in the constitution are to "study the various materials, methods of construction and maintenance, and other highway problems of the United States; to exchange ideas; to promote a closer relationship between state highway departments, with a view of establishing uniform system of administration, construction and maintenance, and legislation for the purpose of conserving the capital invested in highway construction and maintenance by producing the highest possible efficiency; and to cooperate in every way possible with the United States Office of Public Roads or similar federal organization in the consideration of road problems."

The association was organized on Dec. 12, 1914, at a meeting held at Washington, D. C. It had its inception at the road congress held by the American Highway Association at Atlanta, Ga., in November of the same year, when the federal aid bills pending before Congress were being discussed by a party consisting of Dr. Joseph Hyde Pratt, Secretary of the North Carolina State Highway Commission, at that time the state geologist of North Carolina; Henry G. Shirley, Secretary of the Highway Industries Association, and at that time chief engineer of the Maryland

State Roads Commission; Geo. P. Coleman, State Highway Commissioner of Virginia; A. G. Batchelder, Chairman of the Executive Committee of the American Automobile Association; Geo. C. Diehl, County Engineer of Erie County, New York; A. D. Williams, State Highway Commissioner of West Virginia, who was then chief road engineer of that state, and the late S. Percy Hooker, at one time State Highway Commissioner of New York and at the time of his death State Superintendent of Highways of New Hampshire. After discussing the matter for some time these gentlemen decided that the proper body of men to assist in directing efforts for federal highway legislation and uniformity in highway work throughout the country were the officials actively engaged in the work. Accordingly, a call for a meeting to take up the matter of forming an organization was prepared by Mr. Williams, and signed by the representatives of the state highway departments present.

On the evening of the same day a movement was started for the organization of a highway officials' division of the American Highway Association. This meeting was called to order by Logan Waller Page, Director of the Office of Public Roads, and after he had explained the subject, a motion to adjoin the meeting to Dec. 12 at Washington was made by Dr. Pratt, and seconded by Mr. Williams.

In accordance with the action of the state highway officials present at the Atlanta convention, and the action of the meeting referred to, delegates from a number of state highway departments met at Washington on the date named and organized the American Association of State Highway Officials, electing Henry G. Shirley president, Dr. Pratt, secretary, and Frank F. Rogers, State Highway Commissioner of Michigan, treasurer. A constitution and by-laws were adopted, and an executive committee was appointed.

The constitution provides for three classes of members—active, associate and honorary. Active members must be state highway commissioners, chief engineers or other chief directing officials, actively engaged in the administrative work of the various highway departments of the different states and of the United States Government. The associate membership is made up of assistant and deputy commissioners, assistant and resident engineers of state highway departments and chief directing officials in highway departments of other North American countries and their provinces. The honorary members are former state highway officials and professors of highway engineering in accredited universities. Active members, ceasing to be eligible as such, become honorary members, and other honorary members may be elected by the executive committee.

Voting in meetings of the organization is by states, each state department being entitled to one vote, as is also the federal department.

The officers of the association must be selected from the active highway officials of the state highway departments, no two coming from the same state. The officers are a president, a vice president, a secretary and a treasurer. In addition, there is an executive committee, and a financial committee, each of five members, the president and secre-

tary being ex-officio members. No two members of the executive committee may be from the same state. The constitution also provides for the appointment by the president of a committee on tests and investigations and a committee on standards, each to consist of 15 members.

One of the first tasks undertaken by the executive committee was the preparation of a federal aid road law. A rough draft was prepared and forwarded to the different

cago in December, 1915, and a committee was appointed to present it. This committee consisted of Geo. P. Coleman, H. G. Shirley, J. H. Pratt, W. S. Keller and the late Col. E. A. Stevens.

At the annual meeting held at St. Louis, Mo., in 1916, Geo. P. Coleman was elected president, and Wm. D. Uhler was elected chairman of the executive committee. At the 1917 meeting in Richmond, Va., Mr. Uhler was elected president



W. D. UHLER



F. F. ROGERS



J. H. PRATT



A. D. WILLIAMS

American Association of State Highway Officials

President

Lieut.-Col. Wm. D. Uhler, Chief Engineer, Pennsylvania State Highway Department.

Vice President

A. R. Hirst

State Highway Engineer of Wisconsin.

Treasurer

F. F. Rogers

State Highway Commissioner of Michigan.

Secretary

Lieut.-Col. J. Hyde Pratt

Secretary, North Carolina State Highway Commission.

Acting Secretary

A. D. Williams,

Chairman, West Virginia State Roads Commission.



A. R. HIRST

Highway Industries Association

President

S. M. Williams, Sales Manager, Garford Motor Truck Co.

First Vice President

A. R. Hirst,

State Highway Engineer of Wisconsin.

Second Vice President

E. J. Mehren,

Editor, "Engineering News-Record."

Third Vice President

S. T. Henry,

Vice President, Allied Construction Machinery Corporation.

Secretary

Henry G. Shirley.



S. M. WILLIAMS



E. J. MEHREN



S. T. HENRY



H. G. SHIRLEY

EXECUTIVE OFFICERS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS AND THE HIGHWAY INDUSTRIES ASSOCIATION.

state departments. After corrections and suggestions had been made it was returned to the committee, which prepared another draft for presentation at a meeting held at the American Road Congress at Oakland, Cal., in 1915. This second draft was discussed at the meeting, and finally referred to a committee consisting of J. E. Pennybacker, S. E. Bradt and A. D. Williams. A final draft for presentation to Congress was agreed upon at a meeting held at Chi-

ago and Mr. Coleman chairman of the executive committee. Dr. Pratt who had been re-elected secretary at each meeting had entered the service, and A. D. Williams was elected acting secretary. The present officers are as follows:

President, Lieut.-Col. Wm. D. Uhler, Chief Engineer, Pennsylvania State Highway Department, now absent on leave, and in the service; Vice President, A. R. Hirst, State Highway Engineer of Wisconsin; Treasurer, Frank F. Rogers,

State Highway Commissioner of Michigan; Secretary, Lieut.-Col. Joseph Hyde Pratt, Secretary, North Carolina Highway Commission, now in service; Acting Secretary, A. Dennis Williams, Chairman, West Virginia State Road Commission.

Executive Committee: Geo. P. Coleman, State Highway Commissioner of Virginia, Chairman; Edwin Duffey, State Commissioner of Highways of New York; Charles F. Stern, Commissioner, California State Highway Commission; Paul D. Sargent, Chief Engineer, Maine State Highway Commission; J. N. Mackall, Chief Engineer, Maryland State Roads Commission; W. S. Keller, State Highway Engineer of Alabama; T. H. MacDonald, Chief Engineer, Iowa State Highway Commission; Max L. Cunningham, State Engineer of Oklahoma; W. G. Thompson, State Highway Engineer of New Jersey; Ira R. Browning, State Highway Engineer of Utah.

Finance Committee: S. E. Bradt, State Superintendent of Highways of Illinois, Chairman; W. S. Keller; Paul D. Sargent; Edwin Duffey; W. S. Gearhart, State Highway Engineer of Kansas (in service).

The personnel of the convention committees for the Chicago meeting is as follows:

Program Committee: A. R. Hirst, Chairman; W. S. Gearhart, J. N. Mackall.

Entertainment Committee: S. E. Bradt, Chairman; Ira R. Browning, A. C. McKibbin.

The Highway Industries Association

The Highway Industries Association is an organization of the industries engaged in the manufacture and sale of the machinery, materials and equipment used in highway construction and highway transportation. It was organized early this year, chiefly through the efforts of its president, S. M. Williams, Sales Manager of the Garford Motor Truck Co., who had devoted much of his time for several years to furthering the good roads movement.

As the first step in the actual formation of the association, Mr. Williams called a meeting at Pittsburgh, Pa., on Dec. 18, 1917. The meeting was attended by about thirty representatives of various industries and resulted in the formation of a committee to carry on the work of organizing. This committee consisted of S. M. Williams; E. J. Mehren, Editor, "Engineering News-Record"; George S. Bartlett, Portland Cement Association; Will P. Blair, Secretary, National Paving Brick Manufacturers' Association; E. Guy Sutton, Secretary, National Association of Sand and Gravel Producers; A. P. Sandles, National Crushed Stone Association; P. P. Sharples, Manager, General Tarvia Department, the Barrett Co.; W. T. Beatty, President, National Association of Road Machinery Manufacturers; W. A. Alsdorf, Ohio Good Roads Federation; J. F. Cast, Firestone Tire & Rubber Co.; W. T. White, President, the White Company; S. T. Henry, Vice President, the Allied Construction Machinery Corporation.

This committee met at Detroit, Mich., on Dec. 28, drew up a proposed constitution, and called a meeting to form a permanent organization to be known as "the Highway Industries Association." The meeting was held in Chicago, Ill., on Jan. 21, 1918, and was attended by about two hundred representatives of the industries interested. A permanent organization was formed and Mr. Williams was elected president. Messrs. A. R. Hirst, State Highway Engineer of Wisconsin, E. J. Mehren and S. T. Henry were elected first, second and third vice presidents, respectively. Early in the spring H. G. Shirley was chosen secretary. Mr. Shirley was at that time chief engineer of the Maryland State Roads Commission. The directors of the association are as follows:

A. N. Johnson, Portland Cement Association; Will P.

Blair, National Paving Brick Manufacturers' Association; A. P. Sandles, National Crushed Stone Association; H. J. Love, National Slag Association; E. G. Sutton, National Association of Sand and Gravel Producers; E. J. Morrison, National Association of Asphalt Block Manufacturers; S. F. Beatty, National Association of Road Machinery Manufacturers; W. O. Rutherford, Motor and Accessory Manufacturers; W. E. Metzger (motor cars) and W. T. White (motor trucks), National Automobile Chamber of Commerce; P. P. Koehring, Concrete Mixer Association; A. T. Rhodes, Granite Paving Block Manufacturers' Association of the United States.

The objects of the organization are: "To assist in coordinating the highways with the other transportation agencies of the country; to encourage the development of highways that will advance the economic life of the nation; stimulate their use in such a manner as to facilitate and cheapen the transportation of food, raw materials and finished products, and cooperate with Government agencies, both state and national, to the end that our highways may be of maximum service in the transportation system of the country." The attainment of the objects is sought in a variety of ways, but largely through cooperation with other organizations. Much of the work done during the past season has been directed toward assisting its members in the solution of the problems with which they have been confronted, as a result of the war and the restrictions imposed by the Government. On the other hand, the organization has rendered assistance to the Government in the collection of data. Publicity work has also been carried on by means of a weekly bulletin and through the press.

The program of the congress, including the executive and open sessions of the two organizations and the joint open sessions, is as follows:

MONDAY, DECEMBER 9

Morning

8.30 to 9.30 a. m.—Registration of delegates.

Executive Session

American Association of State Highway Officials

President W. D. Uhler, Lieut.-Col. U. S. A., presiding.

9.30 a. m.—President's annual address.

Topic: The Present Situation and How We Are Meeting It:

- (a) In New England—Col. W. D. Sohler, of Massachusetts.
- (b) In the East—A. D. Williams, of West Virginia.
- (c) In the Central West—W. O. Hotchkiss, of Wisconsin.
- (d) In the South—W. S. Keller, of Alabama.
- (e) In the West—Ira R. Browning, of Utah.
- (f) On the Pacific Coast—Chas. F. Stern, of California.

Each speaker has consented to briefly summarize conditions in his section under the following heads: (1) Construction in 1918 compared to other recent years; (2) Special arrangements made for construction work in 1918; (3) Cost of work compared to costs in recent years; (4) Changes in engineering arrangements; (5) plans for 1919; (6) Public sentiment in regard to road work; (7) Proposed legislation of especial interest.

Afternoon

Executive Session

American Association of State Highway Officials

2.00 p. m.—Vice President A. R. Hirst, of Wisconsin, presiding.

The afternoon program will be devoted to a discussion of a few of the more pressing administrative problems confronting highway officials in their efforts to construct and maintain highways.

General Topic: Ways of Doing Construction.

- (a) Contracts, Unit Price and Cost Plus—Alexander W. Graham, of Missouri.

- (b) Day Labor and Force Account Work, Bonuses—Charles M. Upham, of Delaware.
 - (c) Utilizing More Mechanical Devices—F. F. Rogers, of Michigan.
 - (d) Convict Labor—A. D. Williams, of West Virginia.
- General Topic: Materials of Construction.
- (a) Car Shortage, How Can It Be Met?—Clinton Cowen, of Ohio.
 - (b) Bituminous Materials, the Situation and the Remedy, Storage Facilities—C. G. Sheffield, of the U. S. Highways Council.
 - (c) Steel for Bridges, the Situation and a Recommended Bridge Policy—Clifford Older, of Illinois.
- Topic: Engineers for Highway Work—John M. Mullen, of Minnesota.

Evening**Open Session****American Association of State Highway Officials**

8.00 p. m.—George P. Coleman, of Virginia, presiding.
Illustrated Talks:

- (1) Recent Damage to Eastern Highway Systems—W. G. Thompson, of New Jersey.
- (2) Convict Labor in Highway Work—T. J. Ehrhart, of Colorado.
- (3) States having slides showing new types of road, bridge or culvert construction or construction of exceptional interest will bring their slides and show them. The roll of states will be called. Time will not permit showing anything but the new or extraordinary.

TUESDAY, DECEMBER 10**Morning****Executive Session****American Association of State Highway Officials.**

- Col. W. D. Sohler, of Massachusetts, presiding.
- 9.30 a. m.—Topic: Coordinating the State Highway Systems of the Various States—C. M. Babcock, of Minnesota.
- Discussion led by J. J. Murray, of Tennessee.
- Topic: Snow Removal from Country Highways—G. H. Biles, of Pennsylvania.
- Discussion led by A. H. Hinkle, of Ohio, and Stoddard R. Bates, of Vermont.
- Topic: Preparing for After We Have Won the War—S. E. Bradt, of Illinois.
- Discussion led by Wm. F. Cocke, of Florida, and Max F. Cunningham, of Oklahoma.

Afternoon**Executive Session****American Association of State Highway Officials**

- Thomas H. McDonald, of Iowa, presiding.
- 2.00 p. m.—Topic: Eliminating Grade Crossings with Railroads—M. W. Watson, of Kansas.
- Discussion led by W. S. Fallis, of North Carolina.
- Topic: Proper Engineering Treatment of Necessary Railroad Grade Crossings—Rodman Wiley, of Kentucky.
- Discussion led by Charles M. Upham, of Delaware.
- Topic: The Maintenance of Sandy Roads—George A. Duren, of Texas.
- Discussion led by X. A. Kramer, of Mississippi.
- Topic: The Proper Relation Between State and County Highway Departments—H. C. Beard, of Iowa.
- Discussion led by Curtis Hancock, of Texas.

Evening

7.30 p. m.—Annual Informal Dinner of the Association.

WEDNESDAY, DECEMBER 11**Morning****Open Session****American Association of State Highway Officials
Highway Industries Association**

- W. D. Uhler, President, A. A. S. H. O., presiding.
- 10.00 a. m.—Address of Welcome: Hon. Frank Lowden, Governor of Illinois. Response to Address of Welcome, Edwin S. Duffey, of New York for A. A. S. H. O. S. M. Williams, of Ohio, for H. I. A.
- Topic: Highway Control by the Federal Government Under War Conditions—Logan Waller Page, Chairman, United States Highways Council.
- Discussion.
- Topic: Motor Parcel Post Routes—Hon. James I. Blakslee, Fourth Assistant Postmaster General.
- Discussion.
- Appointment of Resolutions Committee.

Afternoon**Open Session****American Association of State Highway Officials
Highway Industries Association**

- S. M. Williams, President, H. I. A., presiding.
- Topic: Highways a Neglected War Time Necessity—Hon. James M. Cox, Governor of Ohio.
- Discussion.
- Topic: A Suggested National Highway Policy and Plan—E. J. Mehren, Editor "Engineering News-Record."
- Discussion.
- Topic: Highway Transportation, Present and Future—Roy D. Chapin, Chairman National Highways Transport Committee.

Evening**Open Session****American Association of State Highway Officials
Highway Industries Association**

- S. T. Henry, Third Vice President, presiding.
- 8.00 p. m.—Highways a Military Necessity.
- The Nation's Needs for Highways Development.

THURSDAY, DECEMBER 12**Morning****Open Session****American Association of State Highway Officials
Highway Industries Association**

- Edward J. Mehren, Vice President, H. I. A., presiding.
- 9.30 a. m.—Topic: The Underlying Principles Controlling the Laying Out, Marking and Maintaining of a State Trunk Highway System—A. R. Hirst, of Wisconsin.
- Discussion led by Paul D. Sargent, of Maine, and Jay W. Bliss, of North Dakota.
- Topic: Proper License Fees for Motor Vehicles and Drivers—H. E. Breed, of New York.
- Discussion led by A. G. Batchelder, of the American Automobile Association; A. B. Fletcher, of California, and Duncan Buie, of Louisiana.

Afternoon**OPEN SESSION.****American Association of State Highway Officials
Highway Industries Association**

- George B. Coleman, Chairman, Executive Committee, A. A. S. H. O., presiding.
- Topic: The Regulation of the Speed, Weight, Width and Height of Motor Trucks and Trailers—George M. Graham, Chairman, Motor Truck Committee of the National Automobile Chamber of Commerce.
- Discussion led by Chas. J. Bennett, State Highway Commissioner of Conn.; A. D. Williams, of West Virginia; Frank H. Zouck, of Maryland; A. W. Graham, of Missouri, and T. R. Dahl, of Ohio.

Topic American Highways for Tomorrow—H. G. Shirley, Secretary, Highway Industries Association.

Discussion led by P. St. J. Wilson, Chief Engineer of the U. S. Office of Public Roads; James Allen, of Washington, and Geo. E. Johnson, of Nebraska.

Evening

Committees of both Associations will meet in accordance with their chairmen's announcement, to formulate reports.

FRIDAY, DECEMBER 13

Morning

Executive Session

American Association of State Highway Officials

President W. D. Uhler presiding.

9.00 a. m.—Topic: The Federal Aid Road Law; Experience to Date and Suggestions for Better Cooperation—Logan Waller Page, Director, U. S. Office of Public Roads.

General Discussion.

Topic: Open Forum on Federal Aid Administration.

The United States Office of Public Roads has arranged to have representatives present who will answer questions on any phase of the work of general interest to the states. It is hoped in this way to thresh out any remaining doubtful points as to procedure in the various steps of getting a project completed.

Topic: Suggested Changes in Federal Aid Highway Laws—T. H. MacDonald, of Iowa.

Discussion led by Charles F. Stern, of California; A. M. Nelson, of Tennessee; Wm. F. Cocke, of Florida; Frank S. Peck, of South Dakota; W. C. Markham, of Kansas, and George P. Coleman, of Virginia.

Open Session

Highway Industries Association

President S. M. Williams presiding.

10.00 a. m.—The Activities of the Highway Industries Association—H. G. Shirley, Secretary.

10.20 a. m.—Conditions We Are Facing—S. M. Williams.

Discussion by Portland Cement Association; National Paving Brick Association; National Crushed Stone Association; National Slag Association; National Association Sand and Gravel Producers; National Association Asphalt Block Manufacturers; National Association Road Machinery Manufacturers; Motor and Accessory Manufacturers; National Automobile Chamber of Commerce; Concrete Mixer Association; Granite Paving Block Manufacturers Association; and others.

Afternoon

Executive Session

American Association of State Highway Officials

President W. D. Uhler presiding.

2.30 p. m.—Continuation of Morning Discussion if Necessary.

Discussion of any Topics of General Interest not fully covered previously.

Reports of Standing Committees.

Reports of Special Committees.

Report of Secretary.

Report of Treasurer.

Report of Committee on Resolutions.

Election of Officers.

Adjournment.

Executive Session

Highway Industries Association

President S. M. Williams presiding.

2.30 p. m.—Roll Call.

Report of Executive Committee.

Report of Special Committees.

Report of Secretary.

Report of Treasurer.

New Business.

Report of Resolution Committee.

Report of Nominating Committee.

Election of officers.

Adjournment.

President and Cabinet Officers Favor Additional Federal Road Expenditures

Wilson, Houston and Baker Advocate Highway Work to Develop Transportation and Provide Employment

President Wilson and Secretary of War Baker agree with Secretary of Agriculture Houston in his advocacy of an enlarged federal road building program, according to recent advices from the Department of Agriculture. Letters received by Secretary Houston from both the President and the Secretary of War are printed below. President Wilson's letter follows:

"I heartily agree with you that it would be in the public interest to resume in full measure the highway construction operations under the Federal Aid Road Act, and to do so as speedily as possible. I understand the necessity which existed for their contraction during the stress through which we have been passing, but that obstacle is now removed. I believe that it would be highly desirable to have an additional appropriation made available to the Department of Agriculture, to be used in conjunction, if possible, with any surplus state and community funds, in order that these operations may be extended. It is important not only to develop good highways throughout the country as quickly as possible, but it is also at this time especially advisable to resume and extend all such essential public works, with a view to furnishing employment for laborers who may be seeking new tasks during the period of readjustment. Knowing that the Department of Agriculture and the state highway authorities in each state have been carefully working out road systems and developing plans and specifications, I have no doubt that all activities in this field can be vigorously conducted through these two sets of existing agencies, acting in full accord."

The letter from Secretary Baker to Secretary Houston was as follows:

"I am in full agreement with your view that there should not only be a prompt resumption of road construction under the Federal Aid Road Act, and under such further authority as may exist for separate state action, but also that additional funds should be made available to your department for the extension of such work. The War Department, as you know, detailed one of its officers to serve with your Bureau of Public Roads in its consideration of highways which might have a value for military purposes, and I shall be glad to have the closest possible cooperation continue as the work enlarges."

Large appropriations from the Federal Treasury to be used separately or in conjunction with local funds, for the improvement of highways would be in the public interest, according to Secretary D. F. Houston of the Department of Agriculture.

Secretary Houston's views were expressed at a recent conference of editors of agricultural journals held in Washington, D. C. After stating that about \$75,000,000 was available for expenditure during the calendar year from unexpended balances of federal appropriations and from state funds, and that there would be about \$20,000,000 next year from federal appropriation, Secretary Houston said in part:

(Continued on page 224)

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

E. L. POWERS
Editor

T. A. HULBERT
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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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23

THE SUPERELEVATION OF HIGHWAY CURVES

The subject of the first article in this issue, the superelevation of highway curves, is one of the essentials in the design of the modern road. Upon it may depend the safety of the users of a road, and it may also have an appreciable effect upon the cost of operating motor-driven vehicles.

Mr. Meeker's article is the second one on this subject in the current volume of "Good Roads," the first, "Superelevations and Easements for Highway Curves," by C. P. Mowry, of the county engineer's office of King County, Washington, having appeared in the issue of July 13. Though the two authors have treated different phases of the subject, and have arrived at somewhat different numerical conclusions, both have pointed out facts that should be noted by highway engineers and have raised points that might be discussed further with profit.

The chief difference in the two is the maximum superelevation recommended. The superelevations given in the table with Mr. Mowry's article are obtained by multiplying the degree of curve by .05, using the formula ($H = .05D$) only up to 40 deg., where it would give a superelevation of 2 ft. Mr. Meeker sets the maximum at 9 in. for an 18-ft. road, which is equivalent to 10 in. in 20 ft, the width used in Mr. Mowry's calculation. As would naturally be expected in view of the greater superelevations, Mr. Mowry's figures for safe speeds around curves are considerably higher than Mr. Meeker's.

Another point that should be noted in comparing the two articles is that Mr. Mowry's calculations are for paved roads, while Mr. Meeker's are general, and further consider the convenience of the traveling public in crossing the road when the curve occurs at an intersection, as frequently happens.

There is one mistake to be guarded against in superelevating curves on highways, and that is the mistake of over-refinement in calculations. Engineering is not absolutely exact, though it is more nearly so than any other science. There is always a permissible degree of inaccuracy and in precise work this fact is recognized, the

permissible error determined, and the work done with allowances for it. In modern road design the chief thing to do is to bank the curves; an inch or two either way on an 18 or 20-ft pavement is not likely to make much difference.

THE BURDEN OF HIGHWAY TRANSPORTATION

Several points that road builders are prone to overlook are made by R. E. Barnett in his article, "Where Lies the Burden of Highway Transportation?" which is printed on other pages of this issue, and they are all points that ought to be considered and that will have to be taken into account before satisfactory progress can be made in road building.

The most important is that a road is merely a means to an end, the end being transportation. As the author points out, there has been a very marked tendency to look upon the road as the end, and this has given rise to a very common misapprehension of what constitutes the cost of a road. The only item in that total cost that road builders have given much attention to is the cost of the road itself, whereas there should also be considered the cost of operation. This cost, as is shown in the diagram, becomes greater than the cost of the road just so soon as the traffic reaches any considerable volume, the exact figures depending, of course, upon the type of road. For the types considered in Mr. Barnett's article, this traffic density is about 50 tons a day. As this represents only a light traffic, the greater importance of operating cost is plain.

Another fact that ought to be brought out in connection with the article is that there is a regrettable lack of data on the relation between traffic density and the cost of maintenance. That is to say, we have very little exact information on how the cost of maintaining given types of pavement varies under different amounts and kinds of traffic, other conditions remaining the same.

If such data were available, charts similar to that accompanying the article could be used advantageously in studies for the selection of pavement types.

RECONSTRUCTION PROBLEMS

Now that the war is over, road builders are confronted with peculiar problems arising from the results of a year and a half of war-time activity and the changed social and industrial conditions in this country and abroad.

The programs of the meetings in Chicago next week quite properly are very largely given over to the consideration of the divers new matters with which road builders and road users will have to deal in what is frequently referred to as the "reconstruction" period. The chief of these, of course, is the remarkable development of highway transportation that has been one of the by-products of the war. In fact, most of the problems that will have to be solved in the future improvement of highways have their origin in this development.

A convention can be made a most profitable medium for the exchange of the ideas that spell progress. The other man's experiences are almost always helpful, but too often unobtainable. The convention makes them available and by subjecting them to discussion brings out valuable details that perhaps have escaped even the man who furnishes them.

There never was a time when those who build the country's roads, those who use them and those who furnish the materials and equipment for both construction and use had more pressing need of getting together and exchanging ideas. The officials of state, county and town highway departments, city street officials, highway engineers, road and paving contractors, road machinery and material manufacturers and dealers, automobile and truck manufacturers,

and the people who are providing transportation over the highways can well afford to embrace every opportunity offered by conventions to meet and talk over their problems.

Upon how these problems are met depends the future of highway transportation and upon highway transportation depends in large measure the future of the country.

President and Cabinet Officers Favor Additional Federal Road Expenditures

(Continued from page 222)

"It seems to me that we should take a further step—take this step not only because of the importance of good roads, but also because of the desirability of furnishing worthy projects on which unemployed labor during the period of readjustment may be engaged. There will be many things suggested for which federal and state funds will be sought. Some of these will be unworthy. Clearly such public works as roads are worthy, and it would be in the public interest to make available large appropriations from the federal

treasury to be used separately or in conjunction with state and local support.

"There need be no delay in the execution of such a program. The nation has already provided the machinery in the Department of Agriculture and in the state highway commissions. The Federal Aid Road Act was fruitful of good legislation, and each state in the union now has a central highway authority with power and funds to meet the terms of the federal act. The two agencies, in conjunction, have been engaged in devising well considered road systems and in making surveys, plans and specifications. The task will be one of selection, and those roads should be designated for improvement which are of the greatest economic importance, with due regard to such military and other needs as are proper for consideration. There is no necessity for any departure from this scheme. The suggestions made have been canvassed with the President, the Secretary of War, and the Postmaster General, and they are in accord with the view that additional funds should be made available to this department and that they should be expended through existing machinery."

HIGHWAY TRANSPORTATION

Heavy Traffic Highways*

Discussion of the Construction of Roads To Accommodate Increasing Weight and of the Limitation of Truck Weights and Loads

The motor truck as a means of transportation has come into recent prominence through its use for war purposes, through its application to freight transfer between adjacent cities and towns and over routes from 50 to 150 mi. in length. Indications are many that, coupled with roads of adequate strength, the motor truck will become an ever increasing factor in this regard. Giving evidence before the Railway Commission of Canada in regard to freight rates, it was recently stated by railway officials that the influence of motor trucks on local freight adjacent to large cities is very great; that in certain cases steam railways now receive very little local freight within a radius of 50 mi. from large cities having systems of good roads adjacent to them, as it is handled by motor truck.

Just as railways were compelled to use heavier rails and increased strength of roadbed to carry heavier trains and engines of the Mogul type, so will it become necessary to build stronger highways to serve the traffic of heavy motor trucks, particularly on main lines between cities, radiating from large centers of population. The wear from comparatively light and rapid traffic of passenger vehicles is first apparent on the road surface. Heavy trucks, on the other hand, while requiring durable surfaces, demand proportionately durable foundations. Heavy motor traffic has a shattering effect on weak foundations. The depth and strength of foundation is a primary consideration in providing roads which will give the motor truck freedom to enter the field of freight transfer to the extent to which it is economically possible.

The cost of constructing roads is largely in proportion to the depth of stone required. The necessary depth of stone will depend largely upon the character of the subsoil over which the road is laid — the safe bearing pressure of the soil; and upon the maximum weight of loaded trucks permitted to use the road. The maximum weight of truck is a controllable factor, and should be fixed by regulation.

*From the annual report of the Department of Public Highways of the Province of Ontario, Canada, for 1917.

With unlimited funds, roads can be built which will sustain unrestricted traffic. But funds available are limited, and it is, therefore, necessary that reasonable standards be fixed and strictly enforced, and that roads be then designed for these conditions.

A reasonable maximum weight of truck should be determined—one which will serve the greater proportion of commercial needs. It is not good business judgment to spend large sums to build roads to the standard of a few trucks of excessive capacity. Trucks of excessive capacity should be prohibited. And regulation is particularly desirable with respect to roads of minor importance, and at seasons of the year when all roads are weakened by moisture and frost.

Dealing with roads of the broken stone or macadam type, the maximum load which a road should carry depends in the first instance on the strength of the subsoil. There is much variation in the supporting strength of different soils, and under different conditions of moisture and climate. Thus clay may vary from hard-pan to clay loam; and a dry clay will support a much heavier load than when wet.

Safe bearing pressures of different soils have been determined in a general way for masonry structures. Experimental investigation with special reference to road surfaces—would no doubt develop useful data; but in the absence of more direct information the bearing pressures adopted for the present purpose are those of the general bridge specifications of this department, viz., gravel, 8 tons per sq. ft.; compact sand or firm clay, 4 tons per sq. ft.; clay moderately dry, 2 tons per sq. ft.; wet clay, 1 ton per sq. ft.; quicksand or wet, yielding soil $\frac{1}{2}$ ton per sq. ft.

A concentrated wheel load is carried downward through a broken stone crust to the subsoil, at an angle which, it is estimated, diverges outward at about 30 degrees from the vertical. Thus the effect of the "macadam" crust is to distribute the wheel load over a greater area of subsoil; this area increasing with the depth of the stone crust. The depth of stone in excess of the layer needed for immediate surface wear is, therefore, regarded as the road "foundation." It is the layer of stone artificially laid over the natural subsoil to the depth necessary to sustain an unyielding surface.

The maximum weight of vehicle (apart from the well recognized influence on bridges) thus largely determines the

depth of foundation necessary on a given road—the depth of foundation varying also according to the nature of the subsoil, and particularly in northern climates, the season of the year during which heavy vehicles may use the road. The constant passage of many light vehicles will, it is true, influence the foundation, and to meet this condition a certain “mass” is required; but a very few heavy vehicles may shatter an insufficient foundation and thus destroy the entire construction. It is necessary, therefore, that the engineer should know whether the maximum load is to be 6 tons, 10 tons, 15 tons, or 20 tons; particularly the maximum load concentrated on one axle or one wheel; and also the width of tire on which the maximum load is concentrated.

Commonly, a motor truck, itself weighing 5 tons, can carry a load of 7 tons, making 12 tons in all. Two-thirds, or 8 tons, is on the rear axle; one-half of that load, or 4 tons, is on the front wheel. The disruptive effect of this load on roads of light construction is very great—particularly in wet seasons.

Steam trucks, with steel tires, in some cases corrugated, are now in occasional use. As an instance, a 5-ton steam wagon in running order with fuel and water weighs about 6 tons 10 cwt., with about 2 tons 15 cwt. on the front axle and 3 tons 15 cwt., on the back axle. Practically all the load would come on the back wheels, so that when loaded with 5 tons the actual weight on the back axle would be 8 tons, 15 cwt., or over 4 tons 7 cwt. on each rear wheel. Motor trucks carrying 15 tons and weighing in all about 30 tons are being manufactured.

Military experience will probably indicate the most desirable type and weight of truck for future industrial purposes. The great majority of trucks now used by the French armies weigh $3\frac{1}{2}$ tons empty, and 7 to 8 tons loaded. This

materially 10 in. in thickness; that 12 in. will take care of a 6-ton load on wet clay; but that 16 in. would be required for a load of 12 tons (a condition which could probably be taken care of by a telford base and broken stone surface having a total depth of 12 in.). In the case of quicksand and wet, yielding soil, it is evident that special drainage or other special construction is necessary to meet the needs of any but a light load.

As clay is a soil which has very largely to be considered, its drainage and climatic conditions are evidently important factors, as indicated by the difference in depth of crust required by a moderately dry clay and one which is wet.

Self-propelled gasoline motor and steam trucks, in addition to their heavy concentrated load affecting the foundation, have the further disadvantage of exerting a strong shearing force transmitted to the road surface by the driving wheels, so that their use demands not only a heavy and expensive foundation, but an especially durable surface as well. Legislation limiting extraordinary traffic of this description is justifiable, in order that a large increase in the cost of roads may not be necessary to serve the requirements of a few vehicles. Such limitation at the present time forestalls the introduction of unnecessarily heavy vehicles, and avoids cases of individual hardship. Width of tire alone will not solve the difficulty, as, owing to the necessary camber of the road surface, excessive width places the load on the edge of the tire. Should investigation justify it, a less weight than that now permitted in Ontario would be most desirable in the interest of road maintenance.

While the limiting loads for Ontario have been fixed as previously stated, it will be desirable to carefully observe the future trend of commercial traffic in order that, if possible, the maximum load may be still further reduced. In 1917

TABLE SHOWING REQUIRED THICKNESS OF ROAD CRUST TO TRANSMIT AT AN ANGLE OF 30 DEGREES FROM THE VERTICAL SAFE BEARING PRESSURE TO SUBGRADES OF VARIOUS SOILS.

Weight on vehicle, tons.	Weight on rear wheel, tons.	Width of tire, inches.	650 lb. per in. width of tire up to 12-in. tire.		Depth of stone in inches		Quick sand or wet, yielding soil, $\frac{1}{2}$ ton	
			Weight per inch width of tire, lb.	Gravel, 8 tons per sq. ft.	Compact sand or firm clay, 4 tons per sq. ft.	Clay moderately dry, 2 tons per sq. ft.	Wet clay, 1 ton per sq. ft.	per sq. ft.
3	1	3.07	650	2.33	3.74	5.98	9.05	13.40
6	2	6.15	650	2.63	4.87	7.92	12.25	18.30
9	3	9.21	650	3.16	5.65	9.20	14.40	21.80
10	3 1-3	10.25	650	3.23	5.67	9.32	14.70	22.40
12	4	12.00	668	3.46	6.10	9.60	16.20	24.80
15	5	12.00	833	4.20	7.26	12.00	18.60	28.20
18	6	12.00	1,000	4.90	8.26	13.50	20.82	31.50
21	7	12.00	1,166	5.48	9.20	14.65	22.50	34.60

standard, applied to road construction generally, would effect a great saving in cost as compared with the maximum of 15 or 20 tons which unrestricted loading will involve. If military preparedness demands provision for heavy artillery loading of 20 tons (and the tendency is still upward) a more moderate standard should be enforced with respect to the great network of purely agricultural and industrial roads which cannot be so built without imposing an unnecessary financial burden.

The accompanying schedule is drawn up with a view to the traffic law of Ontario, which permits a maximum load of 12 tons, or $4\frac{1}{2}$ tons on one wheel; and a maximum pressure of 650 lbs. per in. width of tire. The general assumptions are: That two-thirds of the weight of the vehicle and its load will be carried on the rear axles; that wheel pressure is transmitted downward at an angle of 30 deg. from the vertical; that the various types of subsoil will safely carry the pressure indicated at the head of each column; and that the road crust is solely of broken stone or macadam construction.

From this schedule it is evident that 12 tons is the maximum load which can be carried without producing an excessive tire pressure; that there is little difficulty in providing for a 12-ton load on gravel, compact sand, or firm clay; that clay only moderately dry requires a crust approxi-

there were registered in Ontario 4,929 motor trucks. Of these nearly 75% were classed as 1-ton or less; over 97% were $3\frac{1}{2}$ -ton or less, or within the general military truck standard, while less than 3% were 4-ton and upwards.

A considerable increase in motor truck traffic appears probable after the close of the war. At the present time in Ontario 1 vehicle in 17 is a commercial vehicle; while in the eastern manufacturing states, 1 vehicle in 6 is a truck. Growth of motor truck traffic to the latter proportion will undoubtedly create the need for stronger foundations, particularly on interurban highways; and over certain qualities of sub-soil the use of concrete in place of ordinary broken stone or telford base, is strongly indicated.

Long-Distance Moving by Motor Truck

Household Goods Weighing 7,600 Lb. Carried 186 Mi. In 15 Hours

Moving nearly four tons of household furniture from Pocatello, Idaho, to Salt Lake City, Utah, by motor truck in 15 hours' running time, is cited by a member of the Kissel Motor Car Company's organization as an example of what the truck can accomplish in overland transportation.

The distance between the two cities is 186 mi., and the time made is said to be as good as that made by freight

trains. The truck used $1\frac{1}{2}$ qt. of oil and $15\frac{1}{2}$ gal. of gasoline on the trip, making the average mileage about $12\frac{1}{2}$ mi. to the gallon. There was no trouble during the run, and within an hour and a half after reaching Salt Lake City, the truck had discharged its load and started back with a capacity return load.

Gasoline Conservation in Truck Operation

Efficiency Test Indicates Possibility of Savings Three Times as Great as Those of Motorless Sundays

Three times as much gasoline as was saved by motorless Sundays could have been saved during the year by the motor trucks of America, according to officials of the Packard Motor Truck Co., who base their estimates on the result of the three months' efficiency test conducted by that company.

The conclusions were based upon the increased efficiency shown by the winners of the contest, and it is stated that if truck owners would reduce the cost of hauling as much as those winners did, the 400,000 truck owners of the country would save over \$140,000,000 annually and many million gallons of gasoline. This increased efficiency could be easily obtained by better planning, routing and operation, it is claimed. It is also pointed out that at \$20,000 a mile, the annual saving that might be accomplished would pay for the construction of 7,000 mi. of road each year.

Country-Wide Snow Removal

Highways Transport Committee Cooperating With State Committees

The Highways Transport Committee of the Council of National Defense has adopted a definite program of snow removal and has taken it up with the highway transport committees of the various states with a view to cooperating in the work during the coming winter, according to a recent announcement authorized by the Council of National Defense.

Requests that they give immediate attention to various phases of the problem have been issued to the state highways transport committees of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, Ohio, Indiana, Kentucky, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota, Colorado, Wyoming, Montana, Idaho, Washington, Oregon, California and Nevada. The subjects to which attention is directed, as outlined by Raymond Beck, Field Engineer of the national committee, are as follows:

"First—Of the powers of the state highway department or commission for removing snow. If such powers are not specifically covered by statutes, whether maintenance funds can be used in an emergency?

"Second—What cooperation and work can and will be undertaken by the counties and state?

"Third—What cooperation and work can and will be undertaken by the municipalities and state?

"Fourth—What snow removal machinery, such as scrapers, plows, etc., is available for use by state, county and municipalities?

"Fifth—What preliminary measures can be undertaken which will prevent the drifting of snow, such as location and erection of snow fences? Also, the change of rail, board, picket and hedge fences which check the currents of air during a snowstorm, thus causing drifts to form, and removal of brush or weeds paralleling the road, which invariably cause drifts to form.

"Sixth—Attention by state highway department or commission, through its field organization and in cooperation with the state highways transport committee, of physical conditions along the highways tending to cause drifts. Recommendations as to the best means of dealing with same by preventive methods.

"Seventh—The making of snow removal report of every snow storm on such highways as are designated to be kept free from obstruction by snow, so as to allow continuous essential highways transportation."

Food Costs Dependent on Transportation

Motor Truck Routes Necessary to Reduce the Prices of Foodstuffs

The cost of foodstuffs will not be materially less until the transportation facilities of the nation are improved, according to H. M. Lee, President of the Duplex Truck Co., of Lansing, Mich.

"The retail prices paid by the consumer of farm products," according to Mr. Lee, "average double the price received by the farmer. This is true even where the haul is relatively short.

"Poor roads increase the cost of haulage—while another economic factor in the high cost of food products is the spoilage of perishable foods.

"Food Administrator Hoover recently asserted that half our perishable foodstuffs are wasted, largely through lack of efficient transportation.

"According to Mr. Hoover, fast motor truck express service alone will solve the problem of securing fresh, low priced farm products.

"Mr. Hoover favors tractors and trucks because they will eliminate most of the draft horses which eat the crops of millions of fertile acres. Furthermore, he points out that these animals eat every day of the year, although they do not average three working hours daily.

"Elimination of horses and mules will reduce the cost of food by adding greatly to the acreage of soil used to produce food for men, women and children.

"To decrease transportation charges to a minimum, it will not only be necessary to build good highways throughout the country but to restrict trucking competition.

"Federal control of motor truck express routes may become necessary to make the truck lines profitable and practical. Certainly it would not be wise to allow unrestricted competition among motor truck express companies.

"We have only to look at the high cost of delivering milk over city streets to see what comes of duplication and reduplication of milk wagons traveling the same routes."

PUBLICATIONS

ROCHESTER, N. Y., BUREAU OF MUNICIPAL RESEARCH, INC. "A Municipal Reconstruction Program," paper 6x9 in.; 16 pages including covers.

This booklet is a brief but comprehensive outline of a plan of reconstruction study recommended for the readjustment period following the war.

WAYNE COUNTY, MICHIGAN; BOARD OF COUNTY ROAD COMMISSIONERS. 12th annual report to the Board of Supervisors, for the year ending Sept. 30, 1918. Paper, 6x9 in., 80 pages and covers, illustrated, inset map.

This report follows previous reports of the board in arrangement and includes, besides a detailed report of the operations of the board, chapters on snow and ice removal, a description of the resurfacing experiment conducted by the board, the county's specifications and a map showing the status of road improvement in the county.

MEETINGS

Calendar of Coming Meetings

Dec. 9-13.—American Association of State Highway Officials.—Annual meeting, Chicago, Ill. Acting Secretary, A. D. Williams, Morgantown, W. Va.

Dec. 11-13.—Highway Industries Association.—Convention, Chicago, Ill. Secretary, Henry G. Shirley, 302 Maryland Building, Washington, D. C.

Jan. 14-16, 1919.—Virginia Good Roads Association.—Eighth Annual Convention, Richmond, Va. Secretary, C. B. Scott, Richmond, Va.

Feb. 25-28, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

The November meeting of the Philadelphia Motor Truck Association was held on Wednesday, Nov. 20, at the Hotel Adelphia. Among the principal speakers were George M. Graham, Chairman of the Motor Truck Committee of the National Automobile Chamber of Commerce, who spoke on

the subject "Delivering Our Load After the War"; David S. Ludlum, President of the Autocar Company, and C. A. Musselman of the Highways Transport Committee.

National Highway Traffic Association

A public meeting of the National Highway Traffic Association will be held at the Automobile Club of America, 247 W. 54th St., New York, N. Y., at 8:00 p. m., Monday, Dec. 16, 1918.

The subject of the evening will be "Segregated Traffic Streets," and there will be offered a resolution relative to the regulations now in force in New York City.

Among the speakers will be the following: Dr. John A. Harriss, Deputy Police Commissioner in Charge of Traffic, New York City; William P. Eno, traffic expert, Washington, D. C.; Arthur G. McKeever, of the Ajax Trucking Co., New York City; Richard W. Meade, New York City; George H. Pride, President, Heavy Haulage Co., New York City; Samuel W. Taylor, President, "Rider and Driver," New York City.

The addresses will be followed by general discussions.

EQUIPMENT—TRADE—MATERIALS

Street Grading by Steam Shovel

Thew Machine Used in Repaving Detroit Avenue, Cleveland, Ohio

An example of the adaptability of the steam shovel to shallow excavating is furnished by the repaving of a portion of Detroit Ave. at Cleveland, Ohio.

The work done is on a 3-mi. section of Detroit Ave., in Lakewood, extending from 117th St. to Rocky River. The avenue is an important traffic way, and of late years heavy motor trucks and other vehicles have so badly damaged the pavement that it became necessary to repave the street, using 5-in. granite block on the 2-mi. section between 117th St., and Cranford Ave., and wood block on the remaining mile. A short section of the granite paved portion in front

of Lakewood Hospital will be paved with wood blocks, while granite block will be used at a curve on the wood block section.

The work was divided into three sections, and awarded as follows: Section 1 to Roehl Bros., of Cleveland, at \$98,136; section 2 to the Enterprise Paving & Construction Co., Cleveland, at \$118,522, and section 3 to Baldwin Bros., Cleveland, at \$113,973.

The work on section 1 was commenced on Aug. 22, with a Thew shovel. The street was excavated on each side of the car tracks to a width of 12 ft. and a depth varying from 12 in. at the track to 18 in. at the curb. When the subgrade was completed on Oct. 10, the shovel had removed about 6,600 cu. yd. of asphalt, old macadam foundation and earth. The average rate for the time the shovel actually worked was about 300 lin. ft. daily, in spite of frequent suspension of operations to allow street cars to pass. The capacity of the shovel was further limited, it is said, by the long haul and the consequent inability of the dump wagons and motor trucks to take care of the full capacity of the machine.

The accompanying illustration shows the grade as left by the shovel.

The Watson town Brick Co., of Watson town, Penn., has become a member of the group of licensees of the Dunn Wire-Cut Lug Brick Co., of Conneaut, Ohio, and will engage in the manufacture of wire-cut lug paving brick.

The Water A. Zelnicker Supply Co., St. Louis, Mo., has announced the appointment of James Meyerson as secretary to the president. The company has also announced that A. Kottsieper has joined their traveling forces, and will cover the southwestern territory.



THEW SHOVEL EXCAVATING ON DETROIT AVENUE
REPAVING, CLEVELAND, OHIO.

PERSONAL MENTION

J. P. Davis has resigned as assistant engineer of the Missouri State Highway Board.

W. C. Wangler, Assistant City Engineer of Dayton, O., has been promoted to bridge engineer of that city, to succeed Geo. F. Baker.

George R. Bury, Assistant General Manager of Packard distribution, has been elected general manager of the Packard Motor Car Co., of Chicago, to succeed H. M. Allison, resigned.

Capt. Raymond Rice Knight, formerly city engineer of Ft. William, Ontario, has joined the engineering staff of the Canadian Incinerator Co., Ltd. Mr. Knight is at present in the Detroit office of that company.

C. W. Nash, President of the Nash Motors Co., has returned to Kenosha after a long absence in Washington, where he has had charge of production and engineering in the aircraft department of the Government, under Assistant Secretary of War Ryan. President Nash will again take active charge of the affairs of his company.

R. W. McKinstry has been elected county engineer of Skagit County, Washington. Mr. McKinstry, who recently completed two years' service in France and Belgium, was formerly county engineer of Goodhue County, Minnesota, for three terms. He was a member of the 72d Seaforth Highlanders, and was in the fighting at Vimy Ridge.

Roger J. Gilmore has been made president of the Packard Motor Car Co., of New York, to succeed E. S. Hare, who was recently elected vice president of the Packard Motor Car Co., at Detroit, Mich. Mr. Gilmore has been assistant general manager and vice president of the Packard Motor Car Co. of New York, since March of this year. He has been connected with the Packard Company in various capacities and in different cities since 1909.

Nelson P. Lewis, Chief Engineer of the Board of Estimate and Apportionment of New York City, is a member of the committee of American engineers selected to go to France to study reconstruction problems in that country. The committee goes at the invitation of the Société des Ingenieurs Civils and a committee of the French Engineers' Congress, with the official approval of the French government. Mr. Lewis goes as a delegate from the American Society of Civil Engineers.

A. C. McKibbin has resigned from the Missouri State Highway Board. Some time ago Mr. McKibbin resigned as secretary of the board because, as noted in "Good Roads" for Sept. 28, the Attorney General's Office ruled that although there was no constitutional or statutory provision to the contrary, it was "against public policy for a member of the board to draw a salary as its secretary." This action and Mr. McKibbin's resignation from the board are said to be due to a disagreement as to the policy of the board. Since his resignation from the secretaryship, Mr. McKibbin has devoted most of his time to the development of the Missouri Highways Transport Committee, of which he is chairman. Before becoming a member of the State Highway Board, Mr. McKibbin was secretary of the Automobile Club of St. Louis, and he has been reelected to that office.

George W. Tillson, formerly Consulting Engineer to the Borough President of Brooklyn, N. Y., is one of the committee of engineers that will go to France to study reconstruction problems, note of which is made elsewhere on this page. Mr. Tillson is one of the delegates appointed by the American Society of Civil Engineers. Both he and Mr. Lewis, whose appointment is noted elsewhere, are past presidents of the American Road Builders' Association. It is expected that the American engineers will be gone about six weeks.

W. M. Kinney has been appointed general manager of the Portland Cement Association to succeed H. E. Hilts, resigned. Mr. Kinney has been connected with the cement industry in promotion work for over eleven years, during the past four years acting as engineer of the promotion bureau and inspecting engineer of the Universal Portland Cement Co. He is an associate member of the American Society of Civil Engineers and the American Railway Engineering Association, and a member of the American Society for Testing Materials, the American Concrete Institute, and a number of other engineering organizations. He served as vice chairman of Committee C-1 on Cement of the American Society for Testing Materials, and was active in the establishment of the Structural Materials Research Laboratory at Lewis Institute, Chicago.

OBITUARIES

John F. Richmond, Chairman of the Rhode Island State Board of Public Roads, died recently.

F. C. De Guerre died recently at Vancouver, B. C. Mr. De Guerre had been connected with the city engineer's office of that city, and was later a member of the engineering staff of the Granby Consolidated Power Co.

Phillip W. Brady, an engineer in the City Engineering Department of San Francisco, Cal., from 1864 until 1906, died at his home in that city recently. Mr. Brady rendered valuable service to the city in the restoration work following the fire of 1906.

H. L. Wells, City Engineer of Aurora, Ill., and County Surveyor of Kane County, died recently. Mr. Wells, who was 33 years old, has been engaged in municipal and drainage engineering in the vicinity of Aurora for the past ten years. He and his brother, E. Roy Wells, were partners in the Wells Engineering Co., of Aurora and Geneva, Ill.

The Expenditure of \$1,000,000,000 by the Government for the Construction of National Highways is advocated in a resolution recently adopted by the Chamber of Commerce of Lynchburg, Va. The resolution calls attention to the problems that must be met during the period of transition from a war basis to a peace basis, and argues that road building will provide a profitable and satisfactory method of diverting large labor forces from the destructive work of war to the constructive work of peace. The resolution appeals to states and other units to cooperate with the Federal Government in the policy outlined and with that end in view has been sent to chambers of commerce, Congressmen, and road associations throughout the country.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, DECEMBER 14, 1918

Number
24

Road Construction Methods in Wayne County, Michigan*

Salient Points of Practice Developed During Ten Years of Experience in Building Concrete Pavements

During the ten years that we have been developing and building concrete roads, numerous changes have been made both in specifications and methods followed, based on observation, experience and study. While the majority of these changes have not been drastic, yet, in the aggregate, they bulk large.

Numerous developments and changes have been made and incorporated in our 1918 program of construction. We have recognized the changing traffic conditions through the advent of the motor truck, and have increased the thickness of our roads based on an 18-ft. width, from an average depth of $7\frac{1}{8}$ in. to an average depth of $8\frac{3}{4}$ in. We are

using 7-in. steel channels for our side rails, building on a flat subgrade and putting a crown of $\frac{1}{4}$ in. to the foot in the road metal. This gives an even greater thickness in roads over 18 ft. wide.

We believe that it is necessary to have a greater volume of concrete, irrespective of the width or mix, in order to withstand the vibration set up in a road by heavy, fast moving motor trucks. In our opinion a well built concrete road will not be worn-out eventually so much by abrasion as by vibration.

While we have adopted 18 ft. of concrete, 28 ft. over all, as the minimum width of our roads, it would have been a real economy had we built our main roads for at least 10 mi. out from the limits of Detroit and other large centers

*From the 1918 annual report of the Board of County Road Commissioners of Wayne County, Mich.



TYPICAL CONCRETE PAVED ROAD IN WAYNE COU NTY, MICHIGAN—SHOWING SUPERELEVATION ON CURVE—APPROACH TO GROSSE ILE ROAD.

of population of 24 ft. of concrete, 32 ft. over all. Our main roads are already so congested with motor trucks and trailers with wider gauge and heavier loads, that travel is becoming more difficult and dangerous to the passenger car and horse-drawn vehicle. To aggravate the condition, the main roads cannot be paralleled because of the angles at which they radiate from the center of the city. Some progress toward wider roads has been made, and one of our principal jobs, the Vernier Road, connecting Jefferson and Mack Roads, has been built of concrete 24 ft. wide. Gratiot, another important road, has been built 20 ft. wide. We believe the building of greater widths will prove a relative and actual economy over a period of a few years. This is true because of the large amount of money annually necessary on the narrower roads for macadamizing, graveling and tarring the shoulders.

While it is an old story, we insist upon securing clean, hard, tough, well graded, uniform aggregate, with considerable stress on uniform. Some sacrifice may be made in the

hardness and toughness, to secure uniformity in quality.

About two years ago we changed our specifications from one-course to two-course construction, substituting crushed Wisconsin granite, or crushed trap rock, for pebbles for the wearing course. All of our concrete work this year was of our standard two-course construction, and despite the greater cost, we believe it fully justified by the quality of the finished job.

We are using either pebbles or crushed limestone for the bottom course. Other things being equal, our preference is for one-course construction. While the roads built from crushed stone do not have as many cracks as those built from pebbles, we have many miles of excellent concrete roads of one-course pebble construction from three to nine years old, which are still in splendid condition. The use of the term "two-course" is somewhat of a misnomer, as the wearing surface is compacted and integral with the bottom course. A "two-mix" road would be a better term.

Road Work of the Department of Agriculture

The following extracts dealing with the road work of the Department of Agriculture are taken from the 1918 report of Secretary D. F. Houston, submitted to the President under date of Nov. 15, 1918:

Highway Construction

Considerably in advance of the highway construction season of 1918 steps were taken to conserve money, labor, transportation and materials in highway work and at the same time to facilitate the progress of really essential highway projects.

In connection with the federal aid road work, a letter was addressed to each state highway department asking that a program of federal aid construction be submitted at the earliest possible date, in which would be included only those projects which the state highway departments considered vitally necessary to the transportation facilities of the country. Such programs were submitted by all of the states, and evidence of the thoroughness with which highway projects were considered is disclosed in the statement that, while \$14,550,000 were available for expenditure on post roads from the passage of the act, only \$425,445 were paid from federal funds on all projects. Projects, however, were approved for each state involving sufficient amounts to protect the states in their apportionments.

At the same time a cooperative arrangement was effected, at the request of the Capital Issues Committee, under which engineers of the department were made available for inspecting and reporting upon proposed highway, irrigation, and drainage bond issues. This work assumed considerable proportions almost immediately. Inspections were made of 126 highway projects, involving bond issues to the amount of \$49,276,366; irrigation projects to the number of 25, involving \$18,279,060; and drainage bonds to the number of 30, involving \$19,356,970, or total bond issues of \$86,912,396.

In view of the enormous amount of bituminous materials, comprising oils, asphalts and tars, used in highway work, particularly in highway maintenance, it became early in the season a matter of much concern as to what effect the conservation of fuel oils and tars would have upon the vitally important problem of highway maintenance. Accordingly, the matter was taken up with the Fuel Administration and an arrangement perfected whereby the highways of essential importance should receive enough bituminous material to provide for adequate maintenance and, where necessary,

to permit construction and reconstruction. The cooperation became actively effective on May 13, 1918. From that time until the close of the fiscal year 2,235 applications, calling for 75,000,000 gal. of bituminous material were received from states, counties, and municipalities, and of this amount approval was given and permits issued for 58,000,000 gal. A short time before the close of the fiscal year, however, this cooperation was merged into the larger activities of the United States Highway Council.

United States Highway Council

In order to coordinate the activities of various Government agencies so far as they relate to highways; to better conserve materials, transportation, money and labor; to eliminate delays and uncertainties; and to provide positive assistance in carrying on vitally essential highway work, I requested each of the Government departments and administrations interested to name a representative to serve on a council to deal with highway projects during the period of the war. As a result the United States Highways Council, consisting of a representative from the Department of Agriculture, the War Department, the Railroad Administration, the War Industries Board, and the Fuel Administration, was formed in June. During the first four months of its existence, the council passed upon about 5,000 applications, involving nearly 4,000,000 bbl. of cement, 3,250,000 tons of stone, 1,140,000 tons of gravel, 1,207,000 tons of sand, over 77,000,000 brick, and nearly 20,000,000 lb. of steel and 140,000,000 gal. of bituminous materials.

Further Highway Development

Cooperative construction road work under the federal aid act will be resumed in full measure and be vigorously prosecuted at the earliest possible moment. At the close of the fiscal year approximately \$14,000,000 covered by project agreements were still available for expenditure from federal and state funds, and immediately thereafter the federal appropriation of \$15,000,000 for the fiscal year 1919, also became available. Project statements not yet reaching the stage of agreements, involving \$28,000,000 from all sources, have been approved, making an aggregate, for projects either definitely or tentatively agreed upon, of \$42,000,000. The part of this sum from federal funds is approximately \$16,000,000, leaving uncovered approximately \$14,000,000. If the state contributions for cooperative work continue in the same pro-

portion, there will become available from them approximately \$20,000,000, or a total uncovered, federal and state, of \$34,000,000. It seems clear, therefore, that if the work proceeds without any undue restriction, its volume will be represented by the cooperative expenditure of over \$70,000,000 during this fiscal year. For the fiscal year 1920 there will be available \$20,000,000 of federal funds, which will doubtless be met by a larger contribution from state sources.

The activities should promptly be resumed, because good roads are essential not only for the promotion of better marketing, the fuller utilization of farm labor, larger and more economical production and orderly distribution, but also for the development of a richer and more attractive rural life. Their importance to urban communities and to industry and trade in general is obvious, but there is also a consideration of an emergency nature which would prompt vigorous action. In the transition from war to peace there will doubtless be a period in which some laborers engaged in war industries and men released from the Army will be seeking new tasks and, so far as governmental intervention is

concerned, the tasks on which they may be employed should be of the highest public utility.

Public works would furnish suitable employment for many unemployed men, and among such enterprises there are few kinds whose construction is better worth expanding and pressing than public roads. Many of the states will probably engage in road building as in normal times from funds which they may have available in addition to those pledged to meet requirements of the federal law. Cities also will resume operations in this field, but, in view of the transitional difficulties, we should not depend solely on activity under existing law and financial provisions. An additional appropriation from the Federal Treasury, to be expended through this department for highway construction would seem to be desirable and fully warranted, and such action is suggested for urgent and serious consideration. If ample funds are made available to the department they should be expended on projects selected after consultation with the federal departments interested, especially War, Commerce and Post Office, as well as with the state central highway authorities.

Relation of Highways to Motor Transport Efficiency^{*}

Technically Trained Men Should Be Employed to Build Roads, Old Practice Should Be Modified and Maintenance Should Be Given Attention

By ARTHUR H. BLANCHARD†

The efficient development of highway transportation through the means of the motor truck parcel post service, return load bureaus, intercity freight delivery, rural express and other methods of motor transportation, necessitates the utilization of highways during 365 days of the year and the construction and maintenance of good roads everywhere.

The practical development of this program calls for the expenditure of vast sums of money, at least \$1,000,000,000 annually. The cost of highways of the future is problematical. An indefinite period will elapse before the wages of labor and the cost of materials will be adjusted to normal conditions. These economic questions constitute a problem which must be given exhaustive consideration. One phase upon which it is advisable for all to deliberate is the sources of the unskilled labor so largely used in highway improvement. The World War has materially reduced the available supply in this country, and the reconstruction of Europe will prevent the usual additions through the avenue of immigration. The belief is rapidly growing that the solution is the importation of Asiatic labor.

Today there are in the United States 2,500,000 mi. of rural roads, 12% of which are classed as improved. A conservative estimate would indicate that not more than $\frac{1}{4}$ of 1% of the total mileage is suitable for motor truck trunk highway traffic. During 1917 there was appropriated for the improvement of rural roads \$300,000,000. This work is under the jurisdiction of the Federal Government, the state highway departments, over 3,000 counties in the various states, and the innumerable townships. The scope of this brief resume will not allow a discussion of the methods of financing highway improvement, but it is advisable to strongly emphasize the indisputable fact that it is reckless financing

to construct roadway surfaces which will have a life of 10 years with 50-year bonds.

Today there is no national system of highways in the United States comparable to the world renowned national system of France. Indications point, however, to a rapidly developing sentiment and demand for the creation of a system of interstate highways, aggregating between 50,000 and 150,000 mi., which shall be constructed and maintained under the supervision, and at the expense of, the Federal Government. Such systems of highways as we now have are practically developed through the individual or cooperative action of our state, county and township governments, federal aid constituting a very small percentage of the total amount expended. The development of systems in many parts of the United States is in a chaotic condition, due primarily to lack of foresight and wise administration, local jealousies and ineffective laws.

Efficient and economical highway improvement has been seriously jeopardized in the United States through political interference and the placing of highway work in the hands of laymen who have had no experience in this important technical profession. Unfortunately the public neither appreciates the character of the duties of highway officials nor does it take proper interest in the expenditure of its funds. The people must be educated with respect to the complex work for which highway officials are held responsible and the waste of public funds directly attributed to having highway work in the hands of laymen. It should be emphasized that the primary objects of the educational campaign advocated are: First, the economical and efficient expenditure of the millions of dollars annually appropriated for highway work; and second, the appointment of members of the highway engineering profession to the innumerable positions of responsibility in public life which demand the combination of administrative ability, honest character, and the technical knowledge, training, and experience possessed by qualified engineers.

^{*}Address before the conference on "Modern Methods of Motor Transportation," held under the auspices of the Colt-Stratton Co., New York, N. Y., Nov. 18-23, 1918.

[†]President, American Road Builders' Association and the National Highway Traffic Association.

As in the case of many public activities, it is practicable in connection with this problem to derive valuable suggestions from practice in foreign countries. A review of their histories indicates that they have passed through the same transition period which we are entering. In France, many years ago, the people and the servants of the people realized the advantages accruing from the establishment of a permanent organization of efficient, well-trained highway engineers, and hence there was created the renowned Department of Roads and Bridges of France. Passing across the English Channel, we find similar conditions in Great Britain. In order to secure a dollar's worth for every dollar expended, the British public realized that it was necessary to have in control of their public works men trained in a profession directly dealing with every economic and engineering phase of public improvements. It has, therefore, inaugurated the practice of requiring that applicants for a given municipal or county position shall have attained the grade of membership in the Institution of Civil Engineers of Great Britain commensurate with the responsibility of the work of the particular office. Many leading municipal and county positions require that the applicant shall, first of all, hold the highest grade of membership in the institution, while positions in small counties, towns, and districts require in many cases associate membership. It would seem desirable in this country that a step along the line of English practice might be taken and, in the case of positions of highway officials, there be incorporated in the constitution of a state, or the ordinances of a city, the stipulation that the applicant shall hold a certain grade of membership in the American Society of Civil Engineers and have had a certain number of years of experience in highway work.

The problems confronting the highway engineer of today are entirely different from those which existed 15 years ago. At that time the motor vehicle was not a factor. Today between five and six million motor vehicles use our highways, 10% of which are motor trucks. Instead of constituting practically 100% of the traffic as in 1903, horse-drawn vehicles at present amount to about 5 to 20% on highways outside of urban districts.

With the enormous development of motor truck highway transportation which this country is to witness in the next five years, many established practices in highway work must be remodeled. It is self-evident that the increased tonnage will call for ideal drainage, strong foundations and roadway surfacings suitable for motor truck traffic. In this connection may be cited the recommendation of the former New York State Department of Efficiency and Economy in 1915, that all trunk highways should be built with cement concrete foundations. Dependent upon the amount and character of traffic to which a trunk highway will be subjected during the life of its surface, and other factors influencing its selection, the following types are suitable: Bituminous concrete; cement concrete; brick; and stone block.

As of particular interest to the advocates of the development of motor truck transportation is the present condition pertaining to the width of pavement on trunk highways. Reviewing the construction of the past few years of the types of pavements heretofore mentioned used on trunk highways, it is found that the widths vary from 12 ft. to 18 ft., with a few instances of greater widths. In this connection it is of value to note that the highway committee of the American Society of Civil Engineers recommended several years ago that: "Where motor truck forms a considerable portion of the total traffic likely to use a highway, the unit width of traffic lines should be considered as 9 ft. or 10 ft., instead of 7 ft. or 8 ft. as heretofore." Furthermore, as far back as 1908, the First International Road

Congress, held in Paris, adopted this resolution: "There should be but one roadway for every kind of vehicle, 19 ft. 8 in. wide at least." It is, of course, well known that many of the main county highways of England have an improved surface of from 20 ft. to 22 ft. and that the main trunk highways of France are practically 24 ft. in width. When the rapid development of touring car, motor truck traffic and motor bus routes is given consideration, it is obvious that our important inter- and intra-state trunk highways should have roadway widths of not less than 20 ft.

Other factors in the construction of highways which must be given careful consideration during the next few years are strengthening of highway bridges, grades, location and alignment of highways, adequate guard-rails, and uniform highway signs.

The people of the United States are beginning to appreciate the fact that in order that value is received for the money expended in the construction of highways it is necessary that the highways should be efficiently maintained. Some method must be devised by which the legislatures shall annually appropriate sufficient funds to properly and economically maintain improved highways. Legislature after legislature has followed the procedure of discounting the estimates submitted by highway departments. Hundreds upon hundreds of miles of highways are today improperly maintained, due to a lack of funds. It should be borne in mind that if maintenance is cutailed in one year in a given state to the extent of \$500,000, and miles of highways are thereby left unrepaired, the appropriation required in the following year to repair the damage to the highways not maintained may amount to a million dollars.

It is of vital import that uniform highway traffic laws should be placed on our statutes. Such laws must cover the physical factors and the operation of all types of vehicular traffic. Laws will be based on available data and opinions. There are, at present, innumerable investigations which should be made to ascertain facts pertaining to the inter-relationship of motor truck traffic and the durability and serviceability of highways. If highway departments do not conduct such investigations, they should be undertaken at once by motor truck interests. If the essential data are not available, naturally traffic laws will be based upon conservative conclusions reached by highway officials and members of our legislative bodies.

Michigan Road Plans

Greater State Control and Bond Issue Likely to Come Before Next Legislature

Measures placing the road system of the state under state control and providing for a change in the constitution to permit a road bond issue are likely to come up at the next session of the Michigan Legislature, according to a recent report.

In discussing these matters, State Highway Commissioner Rogers recently pointed out that the present trunk line system comprises 4,786 mi. of road, of which over 25% has been completed. He believes that the substantial improvement of about 2,000 mi. of trunk roads, selecting the roads to be improved in such a way as to fill the gaps between the ends of highways already constructed, would provide a continuous trunk line system connecting all of the principal cities. He believes that this would require at least \$10,000 a mile from state funds, and, therefore, suggest a bond issue of \$20,000,000.

The carrying out of work of this character would necessitate a greater measure of control by the state than exists under the present reward system, and it is thought that legislation to that end may be enacted at the next session.

Necessity for the Proper Location of Roads

By A. DENNIS WILLIAMS, Assoc. M. Am. Soc. C. E.*

So much has been written and spoken on this subject that little would remain as new if we had a perfect digest of all the literature. But no subject can be classed as finally elucidated so long as the fundamental principles remain a part of any great problem; therefore, it would seem that there is something more to be said and written.

The highway problem of America is not solved; it is the biggest question before the American people today. The cost of living, preparedness, and defense depend upon transportation and supplies, and these depend on the road, which, in truth, gets its constitution in its location. The construction and surface are but the by-laws of each passing whim, but the location is the pivot on which the success and failure are balanced. The dropping of a stone, a leaf, or even a drop of water upon one end will tip a beam to inspire, thrill and advance a community, or to stagnate, impede and discourage a section. This beam is the road.

A road may be a canal of mud, a pile of stone, a streak of ruts, or it may be a polished surface sick unto death from neglect and false exploitation; but if properly located it can be restored without a surgical operation. A road surface is placed to meet a condition and can be for only a limited time. A road location should be made to fill a demand for all time. By efficiency we mean service and not always durability. A road may be durable and not serviceable; and, vice versa, it may be serviceable and not durable. To be of value to the community it must be serviceable and if of enduring service it will be more valuable. It is here that we determine the efficiency, the service and the value.

• It has been said that the location, grade and drainage are the only permanent parts of a road, and it can be further said that grade and drainage at an equitable cost can be had only through proper location, which, in turn, can be had only at the hands of skilled and trained men. The locating engineer is an architect of destiny. He can make a community; and he can, through ignorance or carelessness, bind it with a condition that will hamper its growth for all time.

The man who understands certain surfaces and surface materials is a factor and his service is an economic requirement. But the competent locating engineer, who is big enough to comprehend the entire scope of the task before him and to execute that vision into a road that will give maximum service to all parts of the community with a minimum maintenance cost, is a social and economic necessity.

In many instances our roads are not the products of engineering skill but the developments of a custom. Some wild animal or pioneer explorer made a trail which has been widened into a road. No attention has been given to the demands of the community, to the class of soil, the dip or slope of strata, the per cent. of grade or any other item that should be considered in the proper location of a road. In fact they are just happenings. It is often good economy to disregard the old road and make a new location. Here we sometimes find right of way troubles that seem to be great problems, and in some instances it is better to purchase a seemingly expensive right of way than to build a road with a bad grade on slippery soil where drainage will be difficult and maintenance expensive.

Things to note in locating a road are:

(1) Ground that has tendency to slip should be avoided if possible.

(2) The road should be placed on a slope where the dip of the strata leads the water from the road whenever conditions will permit.

(3) The road should be placed, when practicable, on slopes that are exposed to sun in winter, so as to reduce the number of days the road will be covered with ice.

(4) The curvature should be kept to the lowest degree possible so that the longest obtainable sight lines may be had.

(5) The road should be located above high water when conditions will warrant.

(6) The grade should be the best the funds and topography will permit.

(7) For horse-drawn vehicles, distance should yield to grade.

(8) For motor-driven vehicles, alignment and surface may take precedence over the grade, but grade must be considered.

(9) The direction of the traffic and the kind of freight produced in the community should be considered.

(10) The nature of the future development of the territory should always be noted.

(11) The general bearing the improvement will have on other sections of the state and nation should be studied and applied in the general plans.

(12) In short, everything to make the road of the greatest service at the least cost should be done so far as possible and practicable.

Winnebago County, Wisconsin, to Extend Patrol Maintenance

County Board of Supervisors Votes to Include Secondary Highways in Maintenance Program

The Board of County Supervisors of Winnebago County, Wisconsin, recently voted to extend the patrol method of maintenance to a number of roads included in the so-called secondary system of highways. The action was taken on the recommendation of the board's committee on roads and bridges.

The secondary roads on which the patrol system will be employed are the Oshkosh-Waupun Road, the Oshkosh-Ripon Road, the Omro-Berlin Road, the Oshkosh-Winchester Road and the Neenah-Winchester-Fremont Road, all of which were recommended by the committee, and one other road added to the list by the supervisors. The resolution providing for the action carries an appropriation of \$5,000 for scarifying roads and \$10,000 for the salaries and expenses of the patrolmen. The repair and maintenance of the culverts and bridges on the roads are paid for by the towns and villages through which they pass.

“The Pershing Transport Route” has been selected as the name for the highway heretofore known as the Pikes Peak Ocean to Ocean Highway. One of the reasons for the selection of the name is that the road passes the old Pershing home at Laclede, Mo.

Vehicular Accidents in New York State during the month of October resulted in the death of 116 persons, according to figures compiled by the National Highways Protective Society. Of the total, 95 were killed by automobiles, 18 by trolley cars, and 3 by wagons. Seventy-six of the deaths occurred in New York City. Eight people were killed at railroad grade crossings.

*Chairman, West Virginia State Roads Commission.

West Virginia Road Funds

About \$16,000,000 Available for Next Year's Work in the Various Counties

The 59 counties of West Virginia will have about \$16,000,000 available for road work next year, according to a recent statement by the State Roads Commission.

About 60% of this amount will be expended for labor, according to Commissioner Scanlon, unless more machinery is used than has been employed in the past. The funds available include county levies, money from bond issues and various sums from state and federal aid. It is estimated that each of the 59 counties will require about 200 laborers, or a total of at least 11,000.

Road Signs in Texas

State Highway Commissioner Hancock Urges Marking of Roads and Calls Attention to Statutes

Good roads associations can render valuable service to the traveling public by marking highways in which they are interested, according to Curtis Hancock, Chairman of the Texas State Highway Commission.

In a recent statement Chairman Hancock called attention to the work of the King of Trails Highway Association in marking the Texas section of the King of Trails Highway, a road starting at Winnipeg, Canada, and extending to the Mexican border. He also called attention to the present Texas law in regard to the marking of highways, which provides that road overseers must "set up posts of good, lasting timber or stone at the end of each mile leading from the courthouse or some other noted place, and to mark on said posts in legible and enduring figures the distance in miles to said courthouse or other noted place." It is also made the duty of road authorities to place index boards at forks and crossroads, but those provisions are sadly neglected, according to Chairman Hancock.

Colorado to Spend \$4,000,000 for Roads

Plans for 1919 Contemplate Expenditure Greater by Half Million Than That of This Year

A total of about \$4,000,000, which is greater by over \$500,000 than the 1918 expenditure, will be spent for the construction and maintenance of roads under the supervision of the Colorado State Highway Department in 1919, according to a recent report from Denver.

This fund will be secured by direct taxation, from automobile registrations, from interest on the internal improvement fund of the state and from federal aid. The half-mill tax voted several years ago will yield about \$700,000, while the interest on the internal improvement fund will amount to about \$150,000. The income from automobile registration is estimated at not less than \$160,000 and possibly \$200,000, and \$350,000 will be received from the Federal Government. The county expenditures are placed at approximately \$2,600,000, the levies reported thus far being either as high as those of last year or higher.

Among the important projects considered by State Highway Commissioner Ehrhart are the completion of the Fall River Road, connecting Estes Park with Grand Lake; the Rabbit Ear Pass project; the Durango-Silverton Road and the Independence Pass Road. Proposed work in the vicinity of Denver includes the construction of a concrete road from the city limits of Golden to the entrance of Lookout Mountain Park; the extension of the concrete pavement on the Brighton Road to the Henderson line; the construction of a concrete pavement on the North Golden Road for a distance of 2 mi. from the city limits of Denver, and the laying of concrete paving on the Morrison Road from Morrison 2 mi. towards Denver.

Trap Rock Production in the United States

Amount and Value of Basalt and Related Rocks Used for Highway Purposes

The value of the trap rock sold for road metal in the United States in 1917 was \$3,124,088, according to a recent statement by the U. S. Geological Survey. The value of that sold for paving blocks was \$52,755, and that for concrete \$2,654,410. The total amount sold for all purposes in 1917 was 8,852,640 tons (short) and its total value was \$7,570,885. The corresponding figures for 1916 were 10,233,640 tons and \$7,666,297.

New Jersey led in the production of crushed trap for road metal in 1917, the total value of that sold being \$823,832. Pennsylvania was next with a total value of \$530,287 and Connecticut third with \$480,109. The values of the amounts produced and sold in other states producing large amounts were as follows: Massachusetts, \$379,275; California, \$219,542; New York, \$191,675.

California ranked first in the production of trap rock paving blocks, the sales amounting to \$27,074.

Most of the basalt and related rock now quarried is crushed and used as road metal and as concrete aggregate, according to the report. In 1917 these uses and, in a small measure, its use for railroad ballast, accounted for 91% of the quantity and 87% of the value of the trap sold in the country, and for 20% of the quantity and 22% of the value of all crushed stone sold.

Minnesota to Spend \$6,000,000

Plans to Take Care of Increased Motor Truck Traffic Call for Large Expenditures in 1919

The road building program being prepared for 1919 by State Highway Commissioner C. M. Babcock of Minnesota, calls for the expenditure of approximately \$6,000,000 during the next twelve months.

The proposed work, which will bring the mileage of the road system of the state up to approximately 6,000, has been made necessary by the great increase in motor truck traffic over the highways. Traffic counts made in September, 1917, and September, 1918, showed an increase of approximately 400% in motor trucks in the state as a whole. On one road leading out of Minneapolis the 1917 census showed a total of 1,189 vehicles per day, of which 11 were motor trucks. The 1918 count on the same road showed a total of 1,306 vehicles a day, of which 42.3 were motor trucks. On another road the 1917 census showed an average of 3 trucks per day and the 1918 census of 13.3 trucks per day.

Under the present laws of the state, the funds for road building are obtained from a 1-mill state tax, which will yield about \$1,650,000 this year, and by county tax levies amounting to 5 mills on a total valuation of less than \$10,000,000, 3 mills on a total valuation of not more than \$25,000,000 and 1 mill on a valuation of over \$25,000,000. These county levies last year yielded \$4,688,951.88. In addition to these funds Minnesota received \$568,000 from federal funds. If a similar total is received this year, the state will have a road fund of \$6,906,951. It is expected, however, that this amount will be increased, because the reports on road levies received from over 75% of the counties of the state show an average increase of about 20% in road taxes.

It is considered not improbable that the next Legislature will be asked to authorize a bond issue for the building of roads, according to Commissioner Babcock. Several suggestions of this sort have been received. These suggestions mention various amounts, but the general opinion seems to be that the issue should be not less than \$100,000,000.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

Founded January, 1892

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Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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THE ADJUSTMENT OF LOADS AND ROADS

The great development of highway transportation during the war has focused attention upon a problem that has long confronted road builders and users, and that must be solved before it will be possible to get the maximum service from our roads. That problem is the adjustment of loads and roads—the modifications that must be made in the practice of highway construction and the restrictions that must be put upon the vehicles that use the roads.

At the outset it is necessary to have clearly in mind the truth that the road is only a factor in transportation, that in itself it is of no value and serves no useful purpose. It is exactly analogous to a railroad track. It is a means to an end, that end being transportation, and it is complete only when it is combined with a vehicle. That point has been quite fully discussed in these pages before and need be pursued no further at this time.

There are two almost diametrically opposed views as to the solution of the problem. One is that the roads must be built to suit the traffic with no limit upon the latter. The other is that the traffic must be scaled down to the existing roads—or to a point where the burden can be met with a minimum of change in present construction methods and a very slight increase in the present cost of construction and maintenance. Of these two conflicting theories the first is the more nearly correct, for it squares with the principles of progress and is in line with the development of other means of transportation. The events of the past decade have demonstrated beyond possibility of doubt the feasibility of the motor truck as a carrier. As it is so often expressed, "The motor truck has come to stay." There seem to be no mechanical obstacles in the way of a continued increase in the size and capacity of trucks, though under present road conditions, the operating limit seems to have been reached by the heaviest trucks now in use. But with stronger roads there would probably be developed still heavier vehicles, and there would result a situation not unlike the race between locomotives and rolling stock on the one hand and railroad tracks on the other, or between armor and projectiles. And without outside regulation the conflict between the road builder and the builder of vehicles might go on indefinitely, like the race between the

makers of armor plate and the manufacturers of armor piercing projectiles.

In considering the two viewpoints it should always be borne in mind that it is not the road builders or the truck makers whose interests must finally determine the solution. It is the public which ships the goods and pays the freight.

The proposal to restrict loads to the capacity of the present roads—or roads only a little better—is wholly untenable, for it would mean the halting of a development that promises much in the material prosperity of the nation. Highway transportation—only a decade ago of no importance except as supplementary to railway and waterway transportation—has now become a formidable competitor of both. Only a few, comparatively, of our existing roads were built to sustain the traffic that is even now imminent, and to limit highway transportation to that which they can safely carry would be to lose most of the advantages of that means of communication and haulage.

The obvious solution of the problem is a compromise between these two extreme courses of action—but the details are most complex. In general, it will be necessary to build the roads to suit the traffic, for the traffic not the road is the end to be sought. On the other hand, it will be necessary to put some limit on the destructive capacity of the vehicles, not necessarily by restricting the total load, but more probably by limiting the pressure on the road surface and also the disruptive force of the driving wheels. The latter naturally involves the question of speed, which is fully as important as that of weight. And all these factors must be considered with a view to obtaining not cheaper roads, nor the unlimited development of the motor truck, but efficient and economical transportation.

Yet another point that must be given due weight is that highway transportation is an interstate business and that whatever regulations are adopted must be uniform in all the different sections of the country. Either there must be absolute agreement among the laws of the various states—which, judging by experience with laws of other kinds, seems somewhat impracticable—or the regulation must be undertaken by the Federal Government.

The development of highway transportation that has commenced during the war will go on, and with the removal of the restrictions that have hampered road work during the past year there will be a resumption of road work on a bigger scale than ever. Every delay in reaching a solution of the problem of adjusting roads and loads makes a rational solution more difficult and puts it further in the future. Action is needed and needed now.

ROAD BUILDING IN NINETEEN-NINETEEN

From the reports constantly being received from the various states, it seems evident that there is going to be a resumption of road building on a scale even greater than those in closest touch with the situation had dared to hope. This is as it should be, of course, for the great need of the country today is transportation, and that can be had only if the highway systems of the states and the nation are developed to their maximum capacity.

In two states, Illinois and Pennsylvania, large bond issues have been authorized by the voters. In other states, notably South Dakota and Iowa, the issuance of bonds is being agitated, and apparently has the backing of influential interests. There is also considerable sentiment in favor of a bond issue in Minnesota and in Michigan. In many counties, too, the issuing of bonds for extensive road building operations seems likely.

The 1919 road programs of a number of states have been tentatively drawn up, and in most instances the proposed expenditures are at least as large as those of previous years when war did not interfere with internal improvements. In some cases they are considerably larger. The projected ex-

penditures in Texas will amount to about \$25,000,000, while the proposed expenditure in Minnesota is about \$6,000,000. In Louisiana, according to a recent report, more than \$4,500,000 will be spent and in Ohio plans have been made for what is described as the "biggest good roads year" in that state's history. Work under the supervision of the state in Colorado will cost about \$4,000,000, it is predicted.

Less definite plans have been announced for many other

states. Road work has been held up everywhere for a long time and there is a very general disposition to make up next year for the time lost this year and last. While the conclusion of the armistice on the other side has not removed all of the obstacles in the way of renewed activity in American road work, the way of the road builder has been made much easier, and there is every reason to be optimistic in looking forward to next year's operations.

HIGHWAY TRANSPORTATION

Foodstuffs by Motor Truck

Farmer Near Detroit Operates Truck to Deliver Produce to Neighboring City

F. W. Reckling, one of the largest truck farmers in the vicinity of Detroit, is authority for the statement that to the motor truck is due the credit for the ability of truck farmers to produce and deliver better vegetables and grain.

On a 20-mi. haul, a motor truck will bring in a couple of tons of vegetables and produce in 25% better condition than is possible with a team. And at the same time, the credit for the motor truck's being able to accomplish this is due entirely to the good roads that run into Detroit from every farming and trucking section in the vicinity.

Mr. Reckling operates several motor trucks daily, and all have paid for themselves in a comparatively short time. He freely admits that he owes this to the advanced road improvement that has become such a feature throughout Wayne County and that without these roads he, as well as scores of other Wayne County truck farmers, would still be using the teams they did until a few years ago. There are also several truck lines running into Detroit daily that make a specialty of picking up the products of the smaller truck gardeners and delivering them early in the morning to the markets and commission houses, and all of them are said to be hauling capacity loads daily on every truck.

Record Long Distance Motor Truck Haul

Trucks of Tire Manufacturer Carry Loads From Boston to San Francisco and Return Through Los Angeles and Phoenix

What is conceded to be the longest and at the same time a most important achievement in long distance express hauling over highways by motor truck has recently been completed by two trucks, each of 3-ton capacity, owned and operated by the Goodyear Tire & Rubber Co., of Akron, Ohio. This concern, as has been well known for the past year, has been operating a long distance express line between the factory at Akron and Boston, carrying the firm's products to the various distributing branches on the route, at the same time taking on other tires that were required by branches farther along the route. This line was the first long distance intercity express line to be established in this country, and has operated on a regular schedule continuously, excepting for a few days during the bad blizzards of last winter.

The two trucks operated by the company on the round trip transcontinental journey referred to were two of the same trucks that have been operated between Akron and Boston, and were equipped with giant pneumatic tires, so that they were able to run with safety at practically pleasure car speed.

The trip was not undertaken from an advertising standpoint in any sense of the word, but as a war necessity. The Goodyear Company has been manufacturing large numbers of tires for the Government for use on airplanes, and when a sudden call was received for the delivery of a large number of these tires to the military authorities at San Francisco, the company, which had the tires in Massachusetts, decided that the safest and quickest way to insure their arrival was to deliver them by motor truck. It was estimated, based on the time required for other known shipments in less than car-load lots, with the many necessary transfers, that 40 to 50 days would be required to deliver the shipment to the military authorities, with the probability that some of them would be either missing or damaged.

Based on the continued performance of these same trucks over the highways from Boston to Akron and return, the Goodyear Company was confident that delivery of the consignment could be made over the highways in not over 25 days, so it was decided to ship them in this manner. The run of 3,700 mi. from Boston was made in just 20 days, actual running time, with one extra day in which the trucks laid up in Akron. The trip from coast to coast was made, therefore, in 21 days elapsed time. The Boston Post Road was followed from Boston to New York City, and the Lincoln Highway from New York City through Philadelphia, Pittsburgh, Akron, Fort Wayne, Cedar Rapids, Omaha, Cheyenne, Salt Lake City, Carson City, Sacramento and Stockton to San Francisco. Amazement was expressed by the military authorities in San Francisco when the airplane tires were delivered in such a short time.

After a lay-over of 5 days in San Francisco, the trucks took on a load of express matter for the Los Angeles branch and proceeded via the San Joaquin Valley route through Stockton, Fresno and Bakersfield, thereby carrying a full load on the entire run to Los Angeles. The costs of operation, which were accurately kept, will be available later. While they were naturally somewhat higher than freight or even express rates, they can be said to compare favorably when time is taken into consideration, and particularly so in view of the urgent need for war purposes of the loads carried.

The Goodyear Tire and Rubber Co. operates a large cotton plantation near Phoenix, Ariz., so it was decided to have the trucks load up in Los Angeles with some supplies that were needed at this plantation, still making the trip with a full load. This run was made over the National Old Trails Route through the Mojave Desert and via Needles. At the plantation, the trucks were loaded to capacity with bales of cotton to be transported to the Goodyear Cotton Mills at Goodyear, Conn. Therefore, the entire trip of 7,763 mi. by odometer was made with load, and establishes the longest continuous trip record by motor trucks that has ever been made for strictly commercial purposes over our highways. It is an excellent example of what could and would be possible with improved trunk highways throughout the country.

MEETINGS

Calendar of Coming Meetings

Jan. 14-16, 1919.—Virginia Good Roads Association.—Eighth Annual Convention, Richmond, Va. Secretary, C. B. Scott, Richmond, Va.

Feb. 25-28, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

The annual meeting of the Louisiana-Jefferson Highway Association will be held at New Orleans on Jan. 15. The international board of directors of the Jefferson Highway Association will meet in that city on the two days following.

At a convention of bankers of southwestern Kansas held at Pratt late last month, a resolution recommending a road bond issue was adopted unanimously. The resolution recommends to the coming Legislature that it submit to the people a constitutional amendment to permit the state to participate in road work. The action of the convention was taken after an address by J. F. Smith, General Manager of the Kansas Good Roads Association. Mr. Smith explained that the failure of the last Legislature to submit such an amendment was caused by the multiplicity of resolutions offered along the same line, nearly all of them providing also for various other work such as the construction of dikes, drainage and irrigation ditches.

PUBLICATIONS

UNITED STATES DEPARTMENT OF AGRICULTURE. Report of the Secretary, for 1918. Paper 6x9 in., 54 pages and covers.

This is a general report of the work of the Department of Agriculture during the year. It is very largely devoted to the special problems incident to the war, and those to be met during the period of reconstruction. About three pages are devoted to highway matters, including the plans for future work.

CANADA DEPARTMENT OF MINES, GEOLOGICAL SURVEY. "Road Materials in a Portion of Vandreuil County, Quebec, and along the St. Lawrence River from the Quebec Boundary to Cardinal, Ontario," by R. H. Picher. Paper, 6½x9½ in., 12 pages and covers.

This report includes brief descriptions of the geological features in the several sections of the county and several tables showing the results of tests and analyses of rocks, gravel and sand. It also contains a table showing the specifications for water-bound gravel roads, and a table showing specifications for sand for sheet asphalt wearing courses.

ALABAMA STATE HIGHWAY COMMISSION. Seventh Annual Report for the year from April 1, 1917, to April 1, 1918. Bulletin No. 15, 6x9 in., 48 pages and covers, illustrated.

This report contains a general summary of the operations of the commission during the fiscal year followed by financial statements; a series of detailed reports on state aid work in the various counties, and a paper entitled "Highways, Their Cost and Maintenance," by J. H. Craig, Examiner of Public Accounts of Alabama, which was read before the 1918 meetings of the Alabama Good Roads Association. The report contains several illustrations showing road and bridge work in the state.

OHIO STATE HIGHWAY DEPARTMENT. "Solving the Snow Problem on our Highways." Prepared by A. H. Hinkle, Deputy Highway Commissioner, Bureau of Maintenance and Repair. Published by the Ohio State Highway Department, Columbus, Ohio. Paper 5x8 in., 20 pages, including covers, illustrated.

This is a brief treatise on snow removal, in which the subject is treated in two parts, the first dealing with the prevention of drifts and the second with the removal of snow. It is profusely illustrated by views showing snow removal work and illustrating the causes of drifts and methods of prevention, and by diagrams.

Highway Work in Ohio will be pushed vigorously according to recent advices from Columbus, which state that 1919 will be the "biggest good roads year" in the state's history. There are about 300 mi. of highway under contract in the state, according to State Highway Commissioner Cowen, and if labor conditions warrant work will be commenced as early as possible in the spring.

The Commissioners of Columbiana County, Ohio, have recently announced that over \$1,000,000 worth of road work will be started as soon as sufficient labor is available. Funds for the work are in hand, and the road work planned is sufficient to furnish employment for six months or more to over 200 men. Besides the road work contemplated, the county will do a considerable amount of bridge work.

The Detroit Automobile Club has presented to President Wilson a memorial asking for immediate action in the appointment of a Congressional committee to take into consideration a policy of federal road building. The transportation conditions that have existed due to the war are called to the President's attention, and it is asserted that a national system of highways for motor trucks would have enormously increased the nation's hauling capacity, thus relieving the railroads.

The Navy Department has Appropriated \$80,000 for the improvement of highways adjacent to the Great Lakes Naval Training Station. The roads which are to be improved include a portion of the Sheridan Road between the south line of Camp Perry and 22nd St., North Chicago; the continuation of the Sheridan road west of Camp Luce; the highway connecting Sheridan Road with the Green Bay Road at Five Points, and the highway from Five Points to the existing concrete pavement on Morrow Ave.

According to the Report of First Deputy Commissioner Breed of the New York State Highway Department, 410.02 mi. of road were actually completed and accepted during the year of 1917 as against 509.94 mi. completed and accepted in 1916. New contracts awarded during the year were for 91.96 mi. of road, against 630.17 mi. in 1916. The mileage under contract on Dec. 31, 1917, was 1,110.70 as compared with 1,428.77 on Dec. 31, 1916, while the mileage physically completed and not accepted on Dec. 31, 1917, was 509.26 as against 530 on Dec. 31, 1916.

Building the Proposed Delaware River Bridge between Camden and Philadelphia as a monument to Pennsylvania's soldiers in the war has been proposed by John T. Windrim, a Philadelphia architect, who is a member of the Pennsylvania Bridge Commission. Mr. Windrim argues that the cost of the structure would not be materially increased if this plan were followed, since concrete is a material with which ornamental features can be made readily. He proposes that France be invited to send an artist to this country to collaborate with the designers of the bridge.

PERSONAL MENTION

Charles A. Nutter has resigned as city engineer of Ely City, Minn.

E. E. Sommers has been appointed to the Colorado State Highway Commission for District No. 1 to succeed Lafayette Hughes, resigned.

W. C. Marion has been appointed county engineer of Yakima County, Wash., succeeding Lieut. O. E. Brashears, who resigned to enter the service.

S. F. Pingree, President of the St. Louis Automobile Club, has been appointed a member of the Missouri State Highway Board to succeed A. C. McKibbin, whose resignation was noted in "Good Roads" for Dec. 7.

Col. T. Hugh Boorman, of Washington, D. C., addressed several companies of engineers at Camp Humphreys, Va., on the evening of Monday, Dec. 9, on "What Great Britain Did in the War," and "The Work of the Engineer in Reconstruction Days."

George B. Hughes has been appointed city engineer of Ely, Minn., succeeding Charles A. Nutter, resigned.

Lieut.-Col. William D. Uhler, who has been in the service during the war in charge of motor transport, and later as a member of the U. S. Highways Council, has returned to his work as chief engineer of the Pennsylvania State Highway Department.

J. H. Libberton, formerly a division engineer of the promotion bureau of the Universal Portland Cement Co., has been appointed inspecting engineer and engineer of the promotion bureau to succeed William M. Kinnery, whose appointment as general manager of the Portland Cement Association was noted in "Good Roads" for Dec. 7. Mr. Libberton has been with the Universal Portland Cement Co. since 1908, and since February, 1917, has been secretary-treasurer of the American Concrete Pipe Association. He is a member of the American Concrete Institute, the Western Society of Engineers, and the Chicago Engineers' Club.

OBITUARIES

Logan Waller Page

Logan Waller Page, Director of the Bureau of Public Roads of the United States Department of Agriculture, died suddenly of heart disease on Monday, Dec. 9. At the time of his death, Mr. Page was at the Hotel La Salle, Chicago, Ill., where he had gone to attend the joint convention of the American Association of State Highway Officials and the Highway Industries Association. He became ill at dinner Monday evening and died a few hours later.

Mr. Page was well known in road building circles through his long connection with the Government highway department.



L. W. PAGE.

He was born at Richmond, Va., Jan. 10, 1870, and received his education at the Powder Point School, Bear Island Academy, the Virginia Polytechnic Institute and Harvard University. In 1903 he married Anne P. Shaler, of Cambridge, Mass. Mr. Page was geologist of the Massachusetts Highway Commission and director of the testing laboratory at Lawrence Scientific School, Harvard, from 1893 to 1900. From 1900 to 1905 he was chief of the division of tests in the Department of Agriculture. He was appointed director of the Office of Public Roads in 1905 and has remained in charge since that date, the name of the division having been changed to the Office of Public Roads and Rural Engineering in 1915 and to the Bureau of Public Roads during the present year.

Upon the formation of the U. S. Highways Council, Mr. Page was made chairman, and in that position had much to do with the administration of the Government's road policy during the war. He also served as a member of the Highways Transport Committee. He was active in the for-

mation of the American Highway Association and served several years as its president. In addition, he was a member of the American Society of Civil Engineers, the American Society for Testing Materials and the American Road Builders' Association, serving on the board of directors of the latter for several years. Mr. Page lived in Washington and was a member of the Cosmos, Chevy Chase and Harvard Clubs.

He is survived by his widow and one son, his mother, and three brothers.

J. B. White, who was county surveyor of Jefferson County, Arkansas, for several years, died recently at the age of 57.

Lieut. H. C. Peterson, U. S. Engineers, died recently in France. Lieut. Peterson, who was a graduate of the University of Illinois, was engaged in road work for the Illinois Highway Department when war was declared. Pneumonia was the cause of death.

A Road Bond Issue in Iowa is being advocated by the Greater Iowa Association. The amount proposed is not mentioned in the reports, but it is understood that the proposal has met with indorsement in all parts of the state. A series of meetings of the Greater Iowa Association and its directors has been held and further developments are expected in the near future.

Road Expenditures in Texas During the Coming Year are estimated at over \$25,000,000 by Curtis Hancock, Chairman of the State Highway Commission, according to recent advices from that state. Allotments of state and federal aid were made to a number of counties at a recent meeting of the State Highway Commission, the largest being \$62,000 to Erath County. Other large allotments were \$21,253 to San Augustine County; \$25,000 to Wise County; \$31,800 to Morris County; \$60,000 to Palo Pinto County; \$61,275 to Van Zandt County, and \$25,000 to Brazoria County.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

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Day Labor, Force Account Work and Bonuses*

Discussion of Advantages and Disadvantages of Performing Road Work by Day Labor and by Contract, with Notes on the Working of the Bonus System

By CHARLES M. UPHAM†

The question of the economic use of "day labor" in highway construction is an old one and we have records of cases in which this same question was under discussion at least a century ago. In looking into this subject I find that with some officials, in certain sections of the country, the method of doing work by day labor is very popular, but compiling the opinions of a great number of highway engineers, I find that the day labor system has become unpopular, and has the name of being costly and expensive and is without any of the advantages claimed for the contract system. The recent abnormal times that we have just passed through have compelled us to solve many problems. The "day labor system" is one of the unsolved problems, though its name is old. During the past two years we have seen how, in many instances, the day labor system has come to the rescue in emergencies, and in only a few instances has the work been carried on at abnormal cost. In many instances the reasons for high costs could undoubtedly be traced to other causes than the fundamental principles of the day labor system.

In localities where the supervision of the day labor system has been efficient and the organization permanent, this system has produced, and is still producing, good results in construction at reasonable costs—costs that often are lower than those obtained by the contract system. Advocates of both the day labor and contract system state that, properly controlled, their system produces better work. With proper supervision, inspection and specifications, the same results can be obtained in either way, and so the advantages can be compared merely by costs. By theoretical analysis it can be shown that the "day labor" system is not as costly as the contract system, for it does not include the contractor's profits, nor the percentage that is included in the proposal for contingencies.

No state officials desire contractors to do work without profit, nor do they want the uncertainty in their plans and specifications that makes the contractor's proposal become a gamble. It is accepted by all that the contractor should

be paid the cost of his work plus a reasonable profit. In contract work there is generally figured a fair profit and also a percentage for contingencies that do or do not happen. These percentages are in addition to the actual cost of the work which in itself includes the pay for capable foremen, efficient supervision and generally an allowance for the contractor's salary, provided this is not included in the percentage that is added to cover the profits. In other words, the contractor has provided for payment of all his expenditures, plus a reasonable profit and an allowance for contingencies. If these contingencies happen, the contractor should receive a payment covering them, but if they do not happen, it simply makes a gamble out of the proposal, with the contractor the winner.

The day labor system, on the other hand, does not include either of these charges of profit or contingencies, but is the resulting expenditure of the actual cost of the work. Why is it then that "day labor" has not become universally adopted? Why is it that the day labor system is looked upon with suspicion and turned down by engineers wherever there is a possibility of doing work by the contract system?

Many cities, towns and states began their public work by day labor. After a short period, we find, many of these cities, towns and states adopted the contract system to protect themselves, and they now get their work done at more reasonable costs.

That the fear of high costs resulting from the day labor system existed in earlier days is shown by the fact that early in 1800, engineers advocated the abolishment of day labor. It is said that Telford estimated that the cost of work produced by the day labor system was 50% higher than under the contract system. A railroad engineer informs me that he was somewhat surprised that the cost of day labor construction was from 25 to 100% higher than contract work. It is said that in 1909, Metcalf & Eddy went into the comparison of costs of "day labor" and contract work, and in a report to the Boston Finance Commission, the result was in favor of contract work. In a few other instances, however, the results show that the work done by day labor is cheaper than that done by contract, but these cases are in the minority. From these statements

*Paper presented at the fourth annual meeting of the American Association of State Highway Officials, Chicago, Ill., Dec. 9-13, 1918.

† Chief Engineer, Delaware State Highway Department.

it seems that the results point in favor of the contract system for securing good work at reasonable cost.

Before condemning the day labor system, however, a comparison of the development of each is interesting.

Probably the first so-called contracts were contracts for day labor. One instance is shown by a contract covering the digging of a canal in one of the eastern states, in which it was stated that the contractor should furnish a certain number of men, with satisfactory picks, and sufficient wheelers to wheel the dirt shoveled. While this was a contract, it was a contract for day labor. The output in general was controlled by the number of men employed, but the amount of work the men did depended to a certain extent upon the foreman or supervision. The next step was a closer control of the amount of work completed rather than the number of men working.

This was development in the contract system and made this system become popular among contractors. By securing the best supervision and using certain ingenious devices, short cuts in doing work by the contract system were developed and larger profits resulted. As for the owner, the work was completed quicker and at no greater cost. The contract system thus became popular for these various reasons, and especial attention was paid to this system both by owners and engineers. Specifications and detailed plans were developed and complete control of the work was secured. Costs were kept reasonable by the fact that the successful contractors maintained an organization of the best supervision and most up-to-date methods and machinery possible and consequently they could complete work at a comparatively low figure and still make a profit.

What became of the day labor system in the meantime? Cities, counties and towns, and some states, whose officials were changed every election, would commence work by the day labor system. Many times the official would have had no experience in the particular line of work that he undertook, and for supervision he would fill these positions with his friends or political supporters. The results of this poorly organized, inefficient supervision were high costs, and sometimes poor and faulty work. About the time the official became experienced and could have produced satisfactory work at reasonable cost, a house cleaning removed him from office and the same thing was done all over again by the next official. The day labor system has been abused by such methods as these, and there has never been any great attempt to develop this system to the degree that the contract system has been developed. The force account method may be a step in the development of the day labor system, and the cost plus percentage or the cost plus fee method is another stage in the development of the day labor system.

That the day labor system is being abused is shown by the statement of a well known contractor that I interviewed while looking up facts and information on this subject. This contractor has done considerable highway work and had six large contracts under construction. Five of these were day labor or force account work; the sixth was a straight contract. He spent practically all his time on the sixth contract, and when asked why he did this, remarked that the other five contracts were day labor contracts and he could not lose anything, but because this was a straight contract he must give it most of his time, and also his best men. This is a bit of the abuse that makes day labor cost more than contract work and this loose control and indifference by officials is the very thing that is condemning the day labor system.

High costs in day labor construction were many times blamed on the principles of this system, when, as a matter of fact, the real reason was the inefficient organization and the lack of control. Because of the high costs, many cities and towns immediately condemned the method of day labor

system and, without any attempt to overcome the weak points in the system, inaugurated the contract system, a system in which the control and methods had already passed through the experimental state and now was on a developed, definite and sound basis.

With the same regulations and restrictions, and the same personnel in day labor system as in the contract system, both should carry on the work at the same cost to the owner. In the contract system the contractor's profit and payment of the possible contingencies must be added to the costs. One reason why the day labor system is expensive is because this system is generally harnessed by laws that limit the payment of the foremen and supervisors, and thus prevent the high class of supervision of the contract system. Many times the law also states just what the labor shall be paid. This is another serious obstacle for the day labor system to combat.

The limit of salaries of foremen and supervisors subjects the day labor system to many obstacles, for very often it happens that in this day labor system the limit of wages commands supervisors and managers of only ordinary ability or only partially experienced in their particular line.

The contract system, on the other hand, is not restricted as to obtaining the best supervision of labor. The successful contractor is a man of exceptional ability; one who represents the survival of the fittest. With this ability and the resources for efficient supervision, the contract system is immediately put on a firm basis.

Therefore, it seems that the day labor system should not be condemned through reason of the principles of the system itself, but should be passed through a period of development to the same extent that the contract system has. It should not be ridden with laws that combat the motives of the system. It is true that few steps have been taken in this development in the form of force account work and in the "cost plus percentage" or "cost plus fee" system. The day labor system will never be universally popular or successful until it is given the same freedom as the contract system, and is controlled by the same standard of supervision and efficiency.

This subject is supposed to include a few words in regard to bonuses, presumably in connection with labor, but so much time has been taken in the discussion of the day labor system that I will only touch the subject of bonuses wherever they can be used in connection with developing the day labor system. It is especially opportune to speak of the subject of bonuses in connection with the development of the day labor system.

In practice, we find that among contract laborers some men do more and better work than others, while they all may be receiving the same compensation. This does not encourage the men to do their utmost, but is conducive to producing the matter of fact interest in their work. The ideal condition would be obtained under the piece rate system—paying all the men in proportion to the amount of work they turn out. This is not always possible in each individual case, but it can generally be developed with groups of men at least.

By analysis, the bonus system means a piece rate system with a minimum guarantee. An interesting incident noted during the past construction season describes one of the advantages of the bonus system. Two contractors, 7 mi. apart on the same road, having practically the same territory from which to draw labor, were constructing a concrete road. Both contractors at the beginning paid \$4.00 per day for labor. One added a bonus system, whereas the other stated that he would raise the wage if necessary. The man paying the bonus averaged \$4.25 a day in paying his labor. Consequently he soon drew more and better labor. The second contractor, seeing his men leave, raised his wages to \$4.25 and then to \$4.50, and finally to \$5.00, but at

no time did he complete as much work with the same number of men as the contractor that paid the \$4.00 minimum wage plus a bonus. This was really the piece rate system with a minimum guarantee.

The bonus system made each man a sub-contractor and his wages depended on his efforts and the amount of work completed. If the day labor system of doing work could have the benefit and advantage of this spirit among its labor, a great step in developing the day labor system would have been taken.

While the idea of bonuses seems to be old, it has not been used to any great extent, especially with contract labor. The only reason for this seems to be that this branch is another detail not yet developed.

To develop the "bonus system" in contract labor, as it has been developed in the industries, may at the same time make it possible to produce a labor that can be used successfully in the "day labor system," and we may then expect many of the present day difficulties in the successful use of the day labor system to be overcome, and we might possibly find the same efficiency and control in this system as is found in the industries. The operation of that system of "day labor" that has been found so costly and so unpopular among engineers may, with the help of the "bonus system," be developed on an economic plan, closely approaching in practice the theoretical principles of the "day labor" system, and become a popular method of carrying on highway construction.

The Proper Engineering Treatment of Necessary Railroad Grade Crossings^{*}

By RODMAN WILEY†

The subject assigned me is of such specific nature that I beg leave to depart somewhat from the text in order to discuss a little more freely grade crossings in general. I shall use in its broadest sense the term "engineering."

I appreciate the fact that I am attempting to discuss a complex problem and realize that any suggestions made will perhaps be radical, and most impracticable, but am content with the effort if a discussion of the problem will bring forth other ideas which have as an aim more cooperation between railroad companies and the people; which will result in a reduction in the loss of human lives.

When travel was mostly by steel-tired vehicles, the danger at crossings was at a minimum, and naturally the question did not receive, and was not expected to receive, the consideration it does today when most men are endeavoring to save time and make money, and the majority of the travel is by automobile and automobile truck. In order to take care of this new method of travel, the highways are now carefully planned; particular care is being taken to see that the proper type of surfacing is used; wide, strong and expensive types of bridges are being built; but the grade crossings are receiving practically no attention.

A chain is no stronger than its weakest link and naturally one would suppose that inasmuch as we build safe roads and safe bridges to prevent loss of life and materials, so should grade crossings be properly protected for the same reason.

It is believed that some railroad companies and the public in general have failed to appreciate the fact that the highways are one of the great systems of transportation and entitled to the same consideration as that given other transportation systems.

It has been customary for some years when one railroad crossed another railroad company's track for the one desiring the crossing to not only receive permission from its senior, but to furnish the necessary frogs and install all interlocking signals. The same is true when interurban lines cross railroad tracks.

We know it is impossible to span a navigable stream with either a highway or railroad bridge without first receiving a permit from the Federal Government. The Government specifies the length of span and the height the bridge must be placed above low water. In other words, the Govern-

ment appreciates the fact that neither of the other two systems of transportation shall interfere with the safe passage of boats. Yet until very recently it was known to be almost an unheard of thing for highway officials to be consulted when a road was to be crossed by railroad or by interurban or street car lines; in many instances such has been done without even installing danger signals.

In the majority of cases crossings are treated the same today as ten years ago and it appears that the principal cause of the trouble has been the lack of attention not only on the part of the officials, but the people; which naturally implies the lack of engineering advice.

Statistics show that the railroad companies pay out considerable sums of money because of accidents and deaths at grade crossings. Naturally such corporations endeavoring to reduce their expenditures to a minimum—and especially to save human lives—have installed all sorts of safety devices, a great many of which are absolutely ignored by the public. We now find stationary electric bells in some cases, swinging electric bells in others, electric lights, and finally, at the most important places we see gates and watchmen.

Considered from a purely financial standpoint, very few railroad crossings are properly maintained, so that a machine is damaged each time it passes over one. Suppose that the damage to a machine amounts to only one cent and that 100 machines pass that crossing in a day. That means that damage has been done to the extent of \$1 per day or \$30 per month; \$360 per year, which is the interest on \$6,000.

I take it that necessary grade crossings are made so because of great difficulties which would be encountered in eliminating them—such things as the topography of the country, right of way trouble, damage to property and in its final analysis lack of funds, because certainly the majority of crossings are unnecessary, provided the money is available to eliminate them.

It makes no difference what is suggested, there will always be accidents so long as we have grade crossings, and anything that is done is merely an insurance against death or accident and the first question would most naturally be: Who shall pay the bills? We find that when either a highway or railroad company crosses a river which is navigable, it pays the bills, and when one railroad company crosses another, the junior company pays the bills. The same is true of interurban lines crossing the railroad tracks.

One might naturally think that the railroad grade crossing

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question should be handled in the same manner. The railroad company, however, being a corporation, is liable for damages and should, and perhaps would, in most cases, be willing to pay part of the cost, even though it might have priority claim at the crossing. But certainly if the people are determined to travel at a greater rate of speed so that their lives are more in danger than they have been in the past when most grade crossings were allowed to come into existence, and especially when human nature and human carelessness enter so much into the proposition, the public should pay some part of the cost. It should be remembered that the people, not the railroads, have changed their method of travel.

No two men behave exactly in the same manner when crossing a railroad track. A few will stop and listen for approaching trains, others will slow up their machines and look hurriedly to the right and left, but the majority will plunge headlong over the track without taking any precautions whatever, and certainly no concern should be penalized for the lack of attention paid to all warnings, especially when the railroad is a necessity and is rightfully allowed to exist under the laws of the country.

The highest courts in many of our states have refused to give judgment against railroad companies because the drivers of automobiles have not exercised reasonable precautions in crossing railroad tracks.

It is a question of human life against money and I venture, to say that very little will ever be done until the public appreciates the value of a human life. All sorts of excuses will be given and accepted, because in order to properly protect their own lives and the lives of their fellow men, the people would have to pay a little more taxes.

Some engineers after carefully studying the question have recommended that the highway on each side of the railroad track be made straight and level for some distance back of the track. That, of course, is a great precaution, and would tend not only to prevent accidents from collisions with trains, but it would also tend to prevent accidents on the highways, as sufficient sight distance would be provided. Others recommend all sorts of electrical devices and interlocking signals to warn men that a train is within a certain distance of the crossing.

All electrical devices, however, are likely to get out of repair, and might not in isolated districts receive attention for many days. In such cases, no warning would be given in the interim; so we cannot depend entirely upon such things.

Because most accidents are due to the speed at which automobiles are driven, there should be a national law preventing any manufacturer, under heavy penalty, from making any pleasure automobile that can attain a greater speed than 30 mi. per hour; and then every driver could keep his car under control.

Considerable danger could be removed if a great many of the roads were relocated; and that could be done in a great many instances. Where a road parallels a railroad for some distance before crossing, the road should, if possible, be at least 300 ft. from the track and the crossing should, if feasible, be made at right angles to the track. In addition, all obstructions to the view should be removed so that when a man makes the turn preparatory to crossing the track he can see both ways up and down the railroad for some distance.

As an added precaution, it would be well to build a road parallel to the railroad track for a distance of perhaps 300 ft. each side of the main road, and, in all probability, it should be on the railroad company's right of way. The surface of the road should be at the same elevation as the top of the rails. In case a man saw he could not clear the track, or in other words that he was caught, he could turn,

either to the right or left, off the main highway and run his car parallel to the track and prevent a collision.

Of course such things as electric lights, electric bells, etc., should be used in all cases, because they always serve as a good warning.

Important crossings should be well paved, the paving to be level with the top of the rails, so as to prevent a man killing his engine on the track; also to save the wear and tear on vehicles.

Less important crossings could be paved with timber, say 2 in. thick, set on edge, sized so as to make it level with the top of the rails, the timbers to be nailed to the ties and to each other, and all points of contact to be tarred. This would make a rather inexpensive improvement and it is believed the results would be admirable, as 2x4's spiked together and tarred have been used very successfully as flooring for bridges in Kentucky.

As a general proposition, it would be well, as has been advocated, to make the road straight and level with the top of the track for a distance of at least 300 ft. each side of the center line of the railroad and to have all obstructions such as brush, high banks, etc., removed so that a man could see both up and down the track when traveling any part of the 600 ft.

Inasmuch as crossings might be divided into several classes according to their hazardous nature and volume of traffic passing over them, it might be well for representatives of the railroad companies in the various states to meet with the proper highway officials, take a census of all crossings, and divide them into classes. At the most hazardous or otherwise important crossings from a standpoint of travel, in addition to doing all that has been said, it might be well to have gates and watchmen.

Sufficient precaution should be taken either in the way of making such changes as have been advocated, or else the driver of a vehicle should be required to stop and himself, or one of the occupants of the vehicle be required to walk across the track before attempting to drive across.

A street intersection in a busy town might be considered a necessary grade crossing. It is not, of course, in all cases a railroad crossing, but is subject to a great volume of traffic. We find that soon after the advent of the automobile, the police departments in practically all towns had watchmen stationed at the intersections to take care of the traffic.

An examination of the practice of street car companies and interurban companies in crossing the railroads shows that almost invariably the street cars or the interurban cars are required to stop on one side of the track, the conductor crosses the railroad track and signals the car ahead.

I know that complaints would be made by the autoists because of the time required to stop their machines and walk across the tracks, but when a man attempts a journey in an automobile he is aware of the fact that he will, in all probability, have punctures and blow-outs and he is willing to take his chances in order to save time and travel when it suits his convenience, and certainly if he is willing to repair two or three punctures in the course of a journey in order to go as he pleases, he should not complain if a few minutes of his time are taken up endeavoring to save his life.

The public should appreciate the fact that no precaution on the part of any railroad company will save a man's life if he is determined to be a fool.

Men know that insurance is a good thing, but often it is neglected and they die and leave their families penniless. They also know that tuberculosis is usually fatal, but the warnings of a doctor are unheeded and they die a wretched death. And so with railroad crossings; they are dangerous—always will be dangerous—it makes no difference what precautions are taken, and men will endure more danger

in such cases because in order to safeguard their lives they will have to take a little more time and it might cost them a little money to eliminate the danger. All recommendations will amount to naught until it is appreciated that the highways are one of the great systems of transportation and entitled to the same consideration as other transporta-

tion systems, and until the people are ready and willing to place the roads under proper engineering supervision and act on the advice of engineers in everything connected with the system; and finally until the people appreciate the fact that the expenditure of almost any sum of money is desirable if it prevents the loss of a single human life.

The Road Meetings at Chicago

Annual Meetings of the American Association of State Highway Officials and the Highway Industries Association During the Week of December 9

The fourth annual meeting of the American Association of State Highway Officials and the annual meeting of the Highway Industries Association were held at Chicago, Ill., on Monday, Tuesday, Wednesday, Thursday and Friday of last week. In addition to the meetings of these two organizations there were also meetings of a number of other organizations identified with road work, among them being the National Paving Brick Manufacturers Association, the National Crushed Stone Association, the Concrete Mixer Association, the County Commissioners' Association of Illinois, the Cook County (Illinois) Commissioners' Association, the National Association of Road Machinery Manufacturers, the National Association of Sand and Gravel Producers and the Motor Accessory Manufacturers. The American Association of State Highway Officials held executive sessions, as did the Highway Industries Association, and the two met in joint sessions on Wednesday and Thursday. The program in full was printed in "Good Roads" for Dec. 7, and was followed very closely.

The chief interest in the executive sessions of the American Association of State Highway Officials centered upon the subject of federal participation in road work. Two quite different proposals for such participation were placed before the officials. The first recommended increased appropriations by Congress and the administration of the work by the present Bureau of Public Roads of the Department of Agriculture, under the existing federal aid law. The other plan called for a system of national roads, built and maintained by the Government through a federal commission of seven members appointed by the President. It also called for a federal appropriation of \$500,000,000.

A long debate on these two measures followed their introduction and after a close vote had been taken, the matter was referred to committee with instructions to bring in a modified measure. The result was the passage of the following resolution:

BE IT MOVED, by the American Association of State Highway Officials, assembled in convention, at Chicago, on December 10, 1918:

1. That the so-called Page Bill, introduced by Senator Swanson, amending the present provisions of the Federal Aid Road Act, be indorsed by the Association, and its immediate passage urged without further referendum to the various states.

2. That the executive committee is requested not to submit any further legislation to the present short session of Congress.

3. That the executive committee formulate and submit to the various state departments, as soon as may be, a separate bill providing for a federal body or officer with adequate power and funds to administer all federal and federal aid highway laws, which are now, or may hereafter be, in effect. It is the sense of this meeting that the law should be so drawn as to take the fullest possible advantage of the experience and personnel of the present federal administrative body, the effectiveness of the work of which is hampered by the present limitations on salaries and the present too great centralization of the administrative functions, especially as concerns construction matters.

4. We favor an adequate federal highway system upon which the federal aid funds may be concentrated. The federal

system should be selected by the various states and connected at the state lines by the federal department in cases where connections are not made by adjoining states. Nothing in any federal enactment should prevent any state from gaining all the federal aid accruing to it nor deprive any state of the full administrative and legal control of all highways within its borders, and of the location of the improvements on the federal highway system.

Among the other resolutions adopted by the American Associations of State Highway Officials were the following:

WHEREAS, the restriction by the Federal Government of the purchase and sale of steel for highway bridge purposes has made necessary the temporary repair of many highway bridges, and

WHEREAS, in the natural course of wear, decay, and destruction by flood great numbers of other highway bridges have become unsafe or impassable for public travel, and

WHEREAS, this condition greatly impedes the use of the public highways for transportation of food and other products, and

WHEREAS, the need for continued restriction of the use of this material for such an important purpose is not apparent,

BE IT RESOLVED, that this convention urge upon the War Industries Board of the Council of National Defense that all restrictions of the use of reinforcing and structural steel for highway bridge purposes be removed at the earliest possible date.

RESOLVED: That this Association go on record as favoring a uniform traffic law, a uniform regulation of motor trucks and passenger motors, and a uniform law covering the regulation of headlights, such laws to be state laws. And, further, that the efforts of the American Society of Illuminating Engineers in furthering uniform headlight regulations be commended.

RESOLVED, That this Association favor the release of control of highway bond issues by the Capital Issues Committee and that the executive committee be requested to do all in its power to secure such release.

RESOLVED: That steps be taken by the executive committee to secure the release of highway engineers and employees now in the Government service so that they may return to their usual duties to aid in the preparation of plans and details for further highway construction.

RESOLVED: That a committee be appointed to confer with the Highway Industries Association with a view toward getting a real engineering investigation of what weights and types of trucks the various forms and types or designs of highways will stand.

RESOLVED: That this committee submit recommendations as to limiting weights of motor trucks to be used on the various types of highways.

RESOLVED: That the data for this recommendation be obtained from a study of existing data and also from real experiments on the different types of pavements, and that the cost of these experiments be distributed among the states which are financially able to afford the expense of such investigation.

RESOLVED: That the committee develop a comprehensive plan of experiments on which a real recommendation can be made for a uniform motor traffic law for the different types of pavements that is based on facts, not opinions.

RESOLVED: That certain of the resident engineers of the federal department be made members of this committee of investigation.

In addition to these resolutions, there were two providing for changes in the constitution of the association. One

refers to the election of the executive committee, and provides that:

There shall be an executive committee, composed of one from each federal road district, elected at the annual meeting by the membership of the states representing the several districts. The executive committee shall report within 30 days to the various states any action taken by said committee or any subcommittee thereof.

The second provides that the first sentence in Article VI of the constitution shall be amended to read as follows:

An annual meeting shall be held at such time and place as may be designated each year by the annual meeting, and there shall be no meetings held in connection with any other organization.

The resolutions committee consisted of Charles J. Bennett of Connecticut, Edwin Duffey of New York, Paul D. Sargent of Maine, R. T. Brown of South Carolina, Z. E. Severson of Wyoming, H. C. Dutzes of Mississippi, S. E. Bradt of Illinois, C. M. Babcock of Minnesota, Curtis Hancock of Texas and Max L. Cunningham of Oklahoma.

The election of officers for the coming year resulted as follows:

President, A. R. Hirst, State Highway Engineer of Wisconsin; Vice President, Paul D. Sargent, Chief Engineer, Maine State Highway Commission; Treasurer, W. S. Keller, State Highway Engineer of Alabama; Secretary, Lieut. Col. Joseph Hyde Pratt, Secretary, North Carolina State Highway Commission; Acting Secretary, A. D. Williams, Chairman, West Virginia State Road Commission.

Executive Committee: 1923—W. G. Thompson, State Highway Engineer of New Jersey, and Ira R. Browning, State Road Engineer of Utah; 1922—George P. Coleman (Chairman) State Highway Commissioner of Virginia, and Edwin Duffey, State Commissioner of Highways of New York; 1921—Lieut. Col. W. D. Uhler, Chief Engineer, Pennsylvania State Highway Department, and Charles F. Stern, former member of the California State Highway Commission; 1920—Charles J. Bennett, State Highway Commissioner of Connecticut, and William F. Cocke, State Road Commissioner of Florida; 1919—T. H. MacDonald, Chief Engineer, Iowa State Highway Commission, and Max L. Cunningham, State Engineer, Oklahoma Department of Highways.

Finance Committee: S. E. Bradt, State Superintendent of Highways of Illinois (chairman); S. B. Bates, State Highway Commissioner of Vermont; Curtis Hancock, Chairman, Texas State Highway Commission; Rodman Wiley, State Commissioner of Public Roads of Kentucky, and Frank F. Rogers, State Highway Commissioner of Michigan.

The matter of appointing the 15 members of the Committee on Standards and the 15 members of the Committee on Tests and Investigations was referred to the president.

The joint meeting of the two organizations commenced on Wednesday morning at the Congress Hotel. The program for the first session and for the remaining joint sessions was printed in "Good Roads" for Dec. 7, with the program of the executive sessions of the state highway officials. Some of the papers presented are printed in this issue of "Good Roads" and others will appear in later issues. As at the meetings of the American Association of State Highway Officials, there was great interest in the matter of federal road building and, unlike the state highway officials, the delegates present were overwhelmingly in favor of the more far-reaching plan of federal participation. The congress finally adopted the following resolution:

WHEREAS the President of the United States in his recent message to the Congress recognized the value of improved highways in the general transportation system of the nation and should be recommended and urged their rapid development of the roads. In cases necessary to give employment to track, or in other word also to furnish worthy projects on

which unemployed labor can be engaged during the period of readjustment; and

WHEREAS, we recognize the necessity for a well-defined and connected system of improved highways in order to expedite the distribution of large volumes of foodstuffs now wasted on account of the lack of prompt and adequate highway transportation and to better serve the economic and military needs of the nation; therefore

BE IT RESOLVED: That a federal highways commission be created to promote and guide this powerful economic development of both highways and highways traffic and establish a national highways system.

BE IT FURTHER RESOLVED: That the present appropriations for the federal aid to the states be continued and increased and the states urged to undertake extensive highway construction so as to keep pace with the development of this country and its transportation needs, and that in carrying out the provisions of the present Federal Aid Act, or any amendment thereto, the state highway departments shall cooperate with the federal highways commission.

BE IT FURTHER RESOLVED: That all governmental activities with respect to highways be administered by the federal highways commission.

The Resolutions Committee which presented the report consisted of: Paul D. Sargent, Chief Engineer of the Maine State Highway Commission; Windsor T. White, President of the White Company; George C. Diehl, of the American Automobile Association; George E. Johnson, State Engineer of Nebraska; W. O. Rutherford, General Sales Manager of the B. F. Goodrich Co.; J. M. Lowe, President, National Old Trails Road Association; W. G. Thompson, State Highway Engineer of New Jersey; A. N. Johnson, Chief Engineer, Portland Cement Association; John Craft, of the Alabama State Highway Commission; Wm. E. Metzger, President of the Detroit Automobile Club; A. R. Hirst, State Highway Engineer of Wisconsin; W. P. Blair, Secretary, National Paving Brick Manufacturers Association; J. D. Clarkson, General Manager, Jefferson Highway Association; A. H. Blanchard, President, National Highway Traffic Association; H. S. Quine, Goodyear Tire & Rubber Co.; Ira R. Browning, State Road Engineer of Utah; A. P. Sandles, Secretary, National Crushed Stone Association; George P. Coleman, State Highway Commissioner of Virginia; S. F. Beatty, National Association of Road Machinery Manufacturers; H. O. Cooley, of Aberdeen, S. D.; C. F. Adams, of Chillicothe, Mo.; C. H. Houston, of Chattanooga, Tenn., and W. A. Alsdorf of Columbus, Ohio.

Officers for the coming year were elected as follows: President, S. M. Williams, Sales Manager, Garford Motor Truck Co.; First Vice President, George P. Coleman, State Highway Commissioner of Virginia; Second Vice President, E. J. Mehren, Editor, "Engineering News-Record"; Third Vice President, Charles J. Lang, of Cleveland, O., Secretary and Treasurer, Henry G. Shirley.

Federal Aid for the Proposed Vehicular Traffic Tunnel under the North River at New York has been disapproved by the Senate Committee on Interstate Commerce. The estimated cost of the tunnel is \$12,000,000, and it has been hoped by the promoters that half of this sum could be obtained from the Government.

Road Construction will be the Determining Factor in the future of the market for motor vehicles in China, according to a recent issue of the "Commerce Reports." According to a report recently prepared by one of the bureaus of the Department of Commerce there are, as a general rule, no roads suitable for automobiles outside the foreign concessions of the treaty ports, although there are about 150 mi. of such streets in Peking, and a few short stretches of road scattered through the country. There is at present, however, a desire for roads, and a realization on the part of both native officials and foreign residents that highways are essential to the country's development.

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Cable Address: Gudrodes, New York

Copy for advertisements must reach the New York office by noon on Tuesday of the week before date of issue if proofs are to be submitted.

Copy for classified and other advertisements where proofs are not required will be accepted until noon on Monday of the week of issue.

Articles by road builders are solicited. They should be short and, if possible, accompanied by photographs. Those accepted will be paid for at current rates.

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Vol.
XVI

December 21, 1918

No.
25

CHRISTMAS

To its friends—for by that name it prefers to address its readers—"Good Roads" extends the greetings of the season.

For the first time in four years the Christmas festival is to be free from the shadow of war, and "peace on earth, good will to men" is not to be a mockery. The war has ended in victory for the right and we can look forward without fear to a future bright with promise not only of material prosperity but of a better understanding of human relationships. The cost of the war has been great, but it has not been paid in vain. We have learned our power and how to use it, we have learned the meaning of individual sacrifice for the common weal, and we have been roused from our self-satisfied materialism to a realization of the greater things in life.

Among those to whom this message goes there will be some whose Christmas is saddened by the loss of loved ones in the Great War. To them we are able to give no word that will measurably lighten their load of sorrow. But in after years, when time has lessened the poignancy of their grief, will come the sober joy of a just pride in the noble sacrifice of those dear to them who have laid down their lives for home and country.

More than a few of the workers in the field "Good Roads" is privileged to occupy have offered their all in the struggle now ended. To those who have survived the conflict our Christmas greeting must carry an added warmth. For those who are left lying in France we share the proud grief of families and friends.

Whatever of sorrow may have come to us during the year just ending, it is fitting that in the midst of our own affairs we should bear in mind the people of those other countries with whom we have fought shoulder to shoulder and won for mankind. We should remember that our own sacrifices have been little, indeed, as compared with those of the nations that have borne the heat and burden of the day, who for three long, weary years stood between us and the menace of German militarism. At a cost small in com-

parison with the price paid by some of the Allies, the United States will share at least equally in the benefits of the conflict, and humility and thankfulness should have no small place in the emotions of her people at this Christmas time.

WHAT IS THE MATTER WITH THE DAY LABOR SYSTEM?

A most interesting discussion of the comparative advantages of doing road work by the day labor system and by contract is given on other pages of this issue, and we believe that most road builders who have tried both plans will agree with the conclusions reached by the author, Chief Engineer Upham of the Delaware State Highway Department.

One paragraph of Mr. Upham's discussion merits especial attention, for it contains the fundamental reason for the weakness of the day labor plan. Mr. Upham says:

"The limit of salaries of foremen and supervisors subjects the day labor system to many obstacles, for very often it happens that in this day labor system the limit in wages commands supervisors and managers of only ordinary ability, or only partially experienced in their particular lines."

Basically, the method of handling an organization doing work by the day labor system and a contractor's organization doing similar work is the same. If a contractor can do the work for a certain sum of money and make a profit and the cost to the "party of the first part" is greater than that sum when the work is performed by day labor, there must be inefficiency somewhere in the latter plan. There are three factors in the contractor's performance that very largely determine his success—labor, equipment and skilled supervision. A state undertaking work on the day labor plan can obtain as efficient labor as the contractor can secure. It can use as complete and effective equipment. But even when the labor is of the best and the plant is as good as, or better than, that of the contractor, the actual cost is frequently greater than the cost would have been to the contractor plus his profit plus an allowance for contingencies. The obvious conclusion is that the failure is due to lack of skilled supervision.

That such should be the case is not surprising when the question of salaries is taken into account. A state or other highway department organized to carry on its work under the contract system naturally has no official chosen for his ability to direct construction operations. When it becomes necessary to undertake work by day labor, supervision is entrusted to some engineer whose training and experience have been along altogether different lines, and it is illogical to expect him to get the same results that would be achieved by an experienced contractor. Even when an effort is made to secure a competent man to take charge of such work the salary paid, as Mr. Upham points out, is sufficient to secure only mediocre ability—something about equal to that of an exceptionally good foreman.

To make a success of contracting, a man has to be a good business man, an able executive, more or less of a diplomat and a very fair sort of engineer—though most contractors might not subscribe to the last. Such men cannot be hired for even the maximum stipend paid by most states to the men entrusted with the expenditure of the sometimes enormous sums devoted to the construction of the public roads. If they could be, it would not be long before the day labor system would supplant all others in the carrying on of road work.

Ban on Asphalt Imports Lifted

War Trade Board Announces Removal of Restrictions Imposed Last Summer

The War Trade Board has announced that the restrictions on the importation of asphalt have been removed and that applications for licenses to import the material will now be considered.

As noted in "Good Roads" for June 22, asphalt was placed on the restricted import list on June 15. These restrictions placed the limit of imports for the calendar year of 1918 at 30,000 tons from Venezuela and 32,000 tons from the Island of Trinidad.

Oregon Road Work

Highway Commission Formulates Plans for the Expenditure of Over \$6,000,000

The Oregon State Highway Commission has proposed plans for 1919 work for which there is available over \$6,000,000.

Under the highway law of the state the various counties are obliged to perform the grading while the surfacing is done by the state. It is reported that the general policy of the commission for 1919 will be to hard-surface as great a mileage as the counties are prepared to grade.

The funds available include \$3,660,000 from the Hard Surfacing Act; \$855,000 under the Bean-Barrett Act; \$24,000 under the ¼-mill state tax and \$350,000 from the automobile funds. In addition there are the federal funds and the amount to be received from county cooperation, which is estimated at approximately \$600,000.

The total amount available is sufficient to complete the Columbia River Highway from Astoria to Pendleton, the entire Pacific Highway, the Tillamook Highway to Portland and a considerable mileage on post and lateral roads, according to advices. It is said that the State Highway Commission favors the completion of the Columbia River and the Pacific Highways next year.

During the present year, in spite of the difficulties under which work has been done, about 227 mi. of highways were built, connecting over 800 mi. that had previously been improved.

Highway Department for Indiana

New State Road Law Being Prepared for Introduction in Next Session of Legislature

A new state highway commission bill has been drafted for introduction at the coming session of the Legislature of Indiana, according to recent advices from Indianapolis. It provides, in general, as follows:

"1. For the construction of a system of state highways connecting the county seats and the main cities.

"2. For the building of better county roads, with the county as the unit in issuing bonds to pay for the work.

"3. For a patrol system of maintenance of the state highways.

"4. For the issuance of bonds by the state for a long period to cover the cost of the building of the state roads."

The system of state roads provided by the bill would comprise between 3,000 and 4,000 mi. The method of financing calls for the use of the automobile license fees, which amount to over \$1,000,000 annually, now divided among the counties, and the collections under the state inheritance law, which amount to about \$600,000 per year. It is planned to use these funds to pay off the bonds, which would probably be issued for a period of from 20 to 30 years, and in this manner the financing of the roads could be taken care of

without levying an additional tax. It has been proposed to issue state bonds to the amount of \$30,000,000, and although it would be a new departure for the state it is believed that it would be legal.

The new law would, of course, repeal the highway commission law enacted two years ago, and later declared unconstitutional.

To Test Legality of Illinois Bond Issue

Friendly Suit To Be Brought by Taxpayer in Sangamon Circuit Court

The legality of the \$60,000,000 bond issue recently voted in Illinois is to be brought before the Supreme Court of that state for determination, according to a recent report.

This step is proposed for the purpose of removing any possible doubt as to the power of the state to issue bonds. The present plan is to institute a friendly suit in the circuit court to enjoin the state from issuing bonds, and then to carry the case to the Supreme Court. The taxpayer to bring the suit has not been determined upon but the suit will be instituted by Greene & Risely, attorneys, of Mount Carmel. The state will be represented by Assistant Attorney General Rodenberg.

Washington Parish, Louisiana, has voted a bond issue of \$500,000 for the construction of 75 mi. of road. Surveys for the system have already been started.

Two Road Contracts Amounting to \$259,000 were recently awarded in northern Idaho. The contracts are for the construction of a new north and south state highway known as the Whitebird-Grangeville Road.

An Item of \$1,000,000 for Rural Parcel Post Motor Truck Service is included in the annual post office supply bill recently reported in the House of Representatives. The total appropriation called for, \$359,657,577, is less by about \$2,000,000 than the appropriation for the current year.

Highway Construction in Georgia, costing approximately \$800,000, which had been suspended or delayed on account of the war may be undertaken in the near future, according to Chairman T. E. Patterson, of the Georgia Highway Commission. About 40 projects are pending in the state, the most important being the Norcross-Decatur Road and the Atlanta-Macon Road. Another important project is the construction of a bridge between Montezuma and Oglethorpe.

The Paving Commission of the City of Baltimore, Md., is to be recalled on Jan. 1, and its work, which has been suspended for some time, is to be taken up again, according to recent advices from Baltimore. The commission has to its credit an appropriation of about \$1,000,000, which, to date, has not been drawn upon. It is also expected that other street work in the city will be taken up again as a result of the ending of the war.

The State of Pennsylvania has been given a deed by the Delaware, Lackawanna & Western Railroad Company to the 24-mi. section of abandoned right of way of the D. L. & W. between New Milford and Clark's Summit. The old roadbed is to be made a state highway, largely through the efforts of the Lackawanna Trail Association which has been advocating the improvement for some time. An illustrated description of the old roadbed and an account of the work of the association appeared in "Good Roads" for Mar. 23, 1918.

Highway System for Georgia

Proposed Improvement Program Outlined by State Highway Engineer Neel

A plan by which Georgia will be provided with a state-wide highway system has recently been outlined by State Highway Engineer W. R. Neel. The outstanding features of the plan are the building of two classes of main highways connecting county seats and the issuing of bonds to be paid from proceeds of automobile licenses.

The proposed Class A highways will consist of about 2,350 mi. of road passing through 92 counties of the state and connecting the county seats. They will be constructed jointly by the counties and the state. It is proposed that the counties grade the roads and put in all drainage structures at their own expense and that the roads then be hard-surfaced, the cost of the latter being met from the proceeds of the state bond issue. The grading and drainage of these roads is estimated at \$3,000 per mile and the hard-surfacing at \$15,000 per mile.

In counties not traversed by the Class A roads there is to be constructed about 1,350 mi. of highways designated as Class B roads. These are to be well graded, and surfaced with top soil, gravel or sand-clay. They are to be built by the counties and paid for from the proceeds of the state bond issue. The cost of these is estimated at \$4,000 per mile and they will connect with the Class A highways at convenient points.

It is planned to provide funds for carrying on this work by the issuing of \$40,000,000 in state bonds, paying off the principal and interest from the proceeds of the automobile license tax. According to Mr. Neel an average tax of \$20 will provide the necessary funds. He estimates that an average of \$92.50 per car is now wasted in traveling over bad roads, and that the payment of the \$20 tax will actually result in a saving of \$72.50.

The proposed road system will include 12 main routes as follows: Route No. 1, Chattanooga to Thomasville, 395 mi.; Route No. 2, Gainesville to Jacksonville, 340 mi.; Route No. 3, Atlanta to Asheville, 119 mi.; Route No. 4, Atlanta to Montgomery, 184 mi.; Route No. 5, Newnan to Columbus, 70 mi.; Route No. 6, Griffin to Dublin, 101 mi.; Route No. 7, Macon to Valdosta, 195 mi.; Route No. 8, Augusta to Birmingham, 242 mi.; Route No. 9, Columbus to Savannah, 300 mi.; Route No. 10, Savannah to Tallahassee, 305 mi.; Route No. 11, Waycross to Brunswick, 60 mi.; Route No. 12, Augusta to Statesboro, 90 mi.

The Michigan Road Program

Proposed Change in Method of Administering State Road Work Favored by Governor and State Highway Commissioner

Further details of the proposed change in the method of administering highway work in Michigan are given in a recent report from Lansing. As noted in "Good Roads" for Dec. 14, a greater measure of control by the state is deemed advisable and it has been suggested that the constitution be so changed as to permit the issuing of bonds.

The increasing amount of work that is coming upon the State Highway Department and the further increase that would be occasioned by the adoption of a plan such as that outlined would impose too great a burden upon a single state highway commissioner, according to the belief of Governor Sleeper and Frank F. Rogers, the present commissioner. The Governor has, therefore, formulated a plan for abolishing the elective office and substituting a commission of three, the members to be appointed by the Governor for six-year terms, a new member being appointed every two years. It is proposed to make the salary high

enough to attract engineers of ability and experience, and it is understood that Mr. Rogers will be a member of the first commission. His term will not expire until 1920.

It is reported that because of the inability to carry on work during the past season petitions for about 1,000 mi. of road have accumulated with the department. The petitioners have been put off with the argument that the necessary men and materials for doing the work were required in war industries, but in discussing the plans for next year Commissioner Rogers said in a recent interview:

"This isn't going to stop the people from clamoring for good roads next summer. They will contend that the period of readjustment is just the time for road building. I think they are right. They are going to be insistent, anyway. This department will have to enlarge every branch of its activities.

"The work is of a character that would readily permit its division among three commissioners. The state would not be districted; that would defeat the purpose of our comprehensive plan of road building. One commissioner might, however, take charge of roads that are built under federal aid, another might look after state aid roads, and the third take control of building operations that are conducted directly by the state."

Huron County, Ohio, will expend \$500,000 for road improvement during the next year, according to a recent statement by County Surveyor L. C. Herrick. A large portion of this total will be used for the paving of about 5 mi. on Main Market Road No. 1. Much of the work consists of projects that have been postponed because of war conditions.

The Road Officials of El Paso County, Colorado, and the State Highway Department have made a survey of the Ute Pass Road between Iron Springs and Green Mountain Falls, with a view to the elimination of dangerous grade crossings. The relocation of the road may necessitate the institution of condemnation proceedings, but it is expected, if possible, to commence work in the spring.

Milwaukee County, Wisconsin, will resume work in the improvement of its highways early next spring, according to present plans. Contracts amounting to approximately \$500,000 will be awarded. Among the roads which will be completed are the County loop, the Fond du Lac Road, the Burleigh Road, the North Avenue Road and the Center Street Road. A 298-ft. concrete bridge will also be built at a cost of about \$84,000.

A Separate Motor Vehicle Department in New York State will be provided for in a bill submitted to the next Legislature, according to a recent report. At present the supervision of motor vehicle affairs rests with the department of the secretary of state. The National Highways Protective Society, which is said to be back of the movement, proposes to advocate the changing of the law in such a way as to bring these matters under the control of a new agency to be designated as the State Motor Vehicle Department.

The Wisconsin Section of the Sheridan Road has been completed, according to recent advices. The last link was the stretch from Kenosha to the state line. The construction of this road has been promoted by the Sheridan Road Improvement Association of Wisconsin, which was organized something over three years ago to bring about the construction of a road along the lake, connecting Milwaukee with Chicago. Reports from the Sheridan Road Improvement Association of Illinois indicate that probably the entire road will be completed during the coming season.

MEETINGS

Calendar of Coming Meetings

Jan. 14-16, 1919.—Virginia Good Roads Association.—Eighth Annual Convention, Richmond, Va. Secretary, C. B. Scott, Richmond, Va.

Feb. 25-28, 1919.—American Road Builders' Association.—Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

National Highway Traffic Association

A public meeting of the National Highway Traffic Association for the discussion of the topic, "Segregated Traffic Streets," was held at the Automobile Club of America, New York, N. Y., on the evening of Monday, Dec. 16.

The discussion was almost entirely devoted to the traffic ordinances promulgated by the Police Department of New York City and put into effect in September in the Borough of Manhattan. Among the speakers were Arthur G. McKeever of the Ajax Trucking Co., New York, N. Y.; S. W. Taylor, President of "The Rider and Driver," New York, N. Y.; E. P. Goodrich, former consulting engineer of the Borough of Manhattan, and C. G. Bond, of Coulter & Bond, attorneys for the Motor Truck Association. President A. H. Blanchard read letters from Wm. P. Eno of Washington, D. C., and Dr. John A. Harriss, Deputy Commissioner in Charge of Traffic, New York Police Department.

There was much adverse criticism of the New York regulations segregating traffic, and a resolution recommending "radical modifications" of the regulations was taken up. After a long discussion the resolution was referred to a committee, the sense of the meeting being that the authorities should be given further opportunity to try out the regulations, and that the association should not go on record as condemning them until it had something definite in the way of modifications to offer for the guidance of the department.

At the meeting of the Southern Commercial Congress held at Baltimore, Md., during the week of Dec. 9, the Bankhead bill, providing for the appropriation of \$500,000,000 in five annual installments for road building, was among the measures approved. It was voted to hold the next convention in Washington, D. C.

At the closing session of the Southwest Washington Improvement Conference at Chehalis, Wash., State Highway Commissioner James Allen described the work of his department, and urged the adoption of the patrol plan of maintenance. The resolutions adopted approve the Thurston County road bonding plan, and also indorse state roads No. 8 and No. 19.

The Portland Cement Association held a four-day convention at the Biltmore Hotel, New York, N. Y., Dec. 9-12. Among the features of the meeting was a "road dinner" on the evening of Dec. 9. The speakers included George C. Diehl and A. G. Batchelder of the American Automobile Association, and First Deputy Commissioner H. E. Breed of the New York State Highway Department. The annual banquet of the association was held on the evening of Wednesday,

Dec. 11

PERSONAL MENTION

Charles F. Stern, a member of the California State Highway Commission since 1914, has resigned to become state superintendent of banks.

Charles A. Whitmore of Visalia, Cal., has been appointed a member of the California State Highway Commission to succeed Henry J. Widenmann, whose death was noted in "Good Roads" for Nov. 2, 1918.

Gordon I. Lindsay has been elected president of the Robeson Process Co., New York, N. Y., and also president of the American Gum Products Co., of the same city. Mr. Lindsay, who has been general manager of the American Gum Products Co. for several years, will now take active charge of both companies.

Roy D. Chapin, President of the Hudson Motor Car Co., has resigned as chairman of the Highways Transport Committee of the Council of National Defense. Mr. Chapin returns to his business in Detroit after a year's service as chairman of the committee, the work of which will be taken up by John S. Cravens, Chief Engineer of the Field Division of the Council of National Defense.

John H. Gordon, President of the New York State Road Builders' Association, has been put forward by his friends and associates as a candidate for the office of Commissioner of Highways of New York. Mr. Gordon has been a contractor for the past 15 years and has built roads in many parts of the state. Since April of last year he has had charge of the construction of the large warehouses put up for the Government at South Schenectady.

OBITUARIES

Frank K. Pingry, for 17 years assistant engineer of the Park Commission of Essex County, New Jersey, died on Dec. 1. Mr. Pingry was 70 years old.

C. S. Pratt, formerly bridge engineer of Mercer County, New Jersey, died recently at his home in Trenton. Mr. Pratt was at one time deputy county surveyor of Noble County, Indiana, and later city engineer of Sidney, O. He then went into railroad work, serving as resident engineer on the Dayton, Springfield & Urbana Electric R. R. and then as chief engineer of the Springfield & Xenia Railroad. Before his appointment as bridge engineer of Mercer County he was city engineer of Urbana, O.

Henry Prentiss Morrisson, for the past three years commissioner of public works of the Borough of Richmond, New York, N. Y., died at his home at West New Brighton, Staten Island, on Tuesday, Dec. 17. Mr. Morrisson, who was 61 years old, was born at Troy, N. Y., and graduated from the New York University in 1880 with the degrees of B.S. and C.E. He entered the employ of the Department of Public Works in 1881, and in 1882 was made county engineer for Richmond. He was appointed deputy commissioner of highways, sewers and water supply of that borough in 1902. He afterwards entered private practice, but in 1915 again entered the public service as commissioner of public works of the Borough of Richmond. Mr. Morrisson was a member of the American Society of Civil Engineers, the Psi Upsilon Fraternity, the Masonic Order, the Staten Island Chamber of Commerce, and the Staten Island Club.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

WITH WHICH IS INCORPORATED

THE HIGHWAY CONTRACTOR AND ROAD BUILDER

Old Series, Vol. LIV
New Series, Vol. XVI

NEW YORK, DECEMBER 28, 1918

Number
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Proposed Highway System for Minnesota

Description of the 6,000-mi. System of Main Roads Proposed by the State Highway Department, with a Statement by Commissioner Babcock

The establishment of a state trunk highway system for Minnesota is to be recommended at the next session of the Legislature for submission to the people of the state at the 1920 election as an amendment to the present state constitution.

The program provides for a system of about 6,000 mi., comprising the routes shown on the accompanying map, in which only the terminal and junction points are indicated. A more detailed list of the routes was presented in a previous issue of "Good Road." ["Minnesota Trunk Highways," "Good Roads," Nov. 2, 1918, page 168.]

A special fund for carrying on the work will also be created by the amendment, and the Legislature will be authorized to impose a higher license tax on motor vehicles, this license to take the place of all other taxes on such vehicles. The income from it, together with federal aid money and such other receipts as the Legislature may authorize, will form the state trunk highway fund. In order that the work may be started immediately, authorization for a bond issue will be provided in the new law. These bonds, probably \$100,000,000, will be used as money is required, and will run 20 years. The amendment will also authorize the state to engage in the construction of highways, a procedure now prevented by the constitution.

The following statement relative to the proposed plan has been authorized by State Highway Commissioner C. M. Babcock:

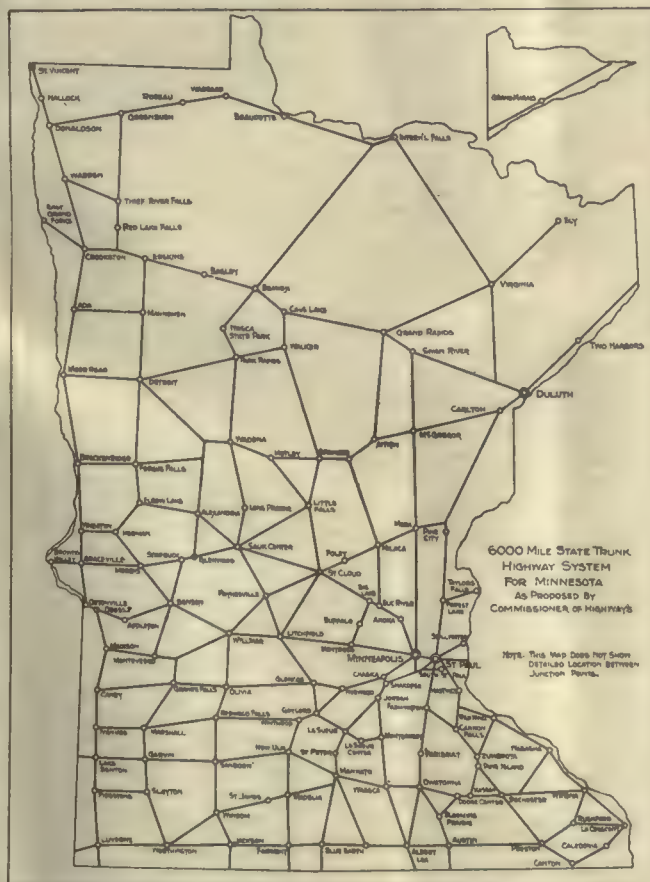
"The Highway Department, in submitting these plans to the Legislature, with the request that they be submitted to the people for approval as a constitutional amendment, has taken this action after due and careful consideration of all things involved and after many conferences with citizens and business men from all parts of the state.

"While the proposed plans are the best that the department has been able to evolve, I desire to say suggestions for changes or alterations will be gladly received and given most careful consideration. We have worked out what appear to us to be the best possible plans, but it is hardly probable they are not capable of improvement.

"With reference to the proposed routes, we have followed the lines of traffic on our existing state roads and have so drafted the plans that every county seat and every city of 2,000 or more is reached by the trunk highway system. The people will be given opportunity to be heard on these routes and if changes are necessary to take care of the needs, they can all be made before the amendment is submitted.

"If the amendment is approved, the bonds will be sold as the money is needed for construction work. The returns from motor vehicle licenses should be sufficient to take care of the sinking fund and retire the bonds within the 20-year period, with little or no assistance from general tax levies.

"The value of such a system to the state is beyond the comprehension of anyone.



THE PROPOSED MINNESOTA TRUNK HIGHWAY SYSTEM.

From a commercial and economic point of view, it will be worth many times its cost and it will attract to the state thousands of tourists who will come to enjoy the great attractions of the great lake region.

From the point of the motorist, there can be no objection. While his license rate will be higher, the cost of operation of his car will far more than offset it. There are more than 200,000 cars in the state. On an average mileage of 5,000 mi. a car each season, the total car mileage of automobiles is 1,000,000,000 mi. Figuring the cost of operation at 10 ct. a mile, the cost of operating cars in the state totals \$100,000,000 a year. A saving of 10% can easily be made by operating over well improved roads. This would mean a saving of \$10,000,000 a year, or \$200,000,000 in the 20-year period.

"I would call particular attention to the fact that this plan will not disturb the state road and bridge fund—known as the 1-mill tax under the Dunn Law—and the counties will have four or five times as much money to spend on their county road systems, which will be the 'laterals' or 'feeders' to the trunk highways.

This is due to the fact that out of every \$10 received by the counties for roads and bridges, approximately \$8 is being spent on the identical roads which will be included in this system."

According to Commissioner Babcock, sentiment in the state favors a comprehensive system of hard-surfaced highways and he believes that the proposed legislation will meet with the approval of the people.

Preparing for After We Have Won the War*

By S. E. BRADT†

At the time this topic was assigned to me, after war conditions were largely a matter of speculation, and even today with the war won, there is still but little indication of what those conditions are to be. For the purpose of reaching a fair conclusion as to these problems, we have consulted the heads of economic departments of at least ten of the universities of this country; also the state and federal departments of labor. In addition to this we have had access to the reports of the leading statistical organizations, as well as to the magazine writers of this country and of England.

In the war just closed the men actually engaged were counted by the millions as compared to hundreds of thousands in any previous war. Money has been expended by the hundred billions as compared to the hundred millions heretofore. The disturbance of normal conditions has been in proportion to the men and money involved. Hence the task of readjustment is correspondingly greater than that following previous wars.

We mobilized in the United States for the army and navy approximately 4,500,000 men. It has been estimated that it has required four civilians to each man in the army to provide food, clothing and other war necessities, which would mean approximately 18,000,000 men in war work. Of the above number probably 3,000,000 of civilians were employed in war industries, the necessity for which ceased with the signing of the armistice. These men will be released from their present employment as rapidly as contracts can be legitimately canceled and the war industries closed down. Adding to these 3,000,000 civilians approximately 3,000,000 soldiers and sailors, shortly to be released, we have a total of 6,000,000 people who must be returned to their old places or be given new ones. Those returning to their old places in many instances will displace others now filling them. The reabsorption of this vast number of men into our industrial life is the main problem that now confronts this nation.

The two phases of this problem that more directly concern those in charge of highway work are:

1. Its probable influence upon wages.
2. Our duty to assist in this crisis, through the employment of labor.

This condition of labor seeking employment undoubtedly

presages among other things a readjustment of the wage scale. Indications are that this readjustment will be very gradual and that we may not for many years, if at all, reach the pre-war schedule. While the conditions following the Civil War may not be any guide in the present situation, yet it is of interest to know that wages from 1865 to 1870 made a gradual increase, while at the same time commodity prices gradually decreased. Wages are so much higher now than at the close of the Civil War and unemployment likely to be so much greater, that we do not look for a similar increase. On the other hand, while commodities are higher, yet we must remember that we are now subject to a measure of Government price control; and what is of greater import the war area is so much larger, involving a world shortage of foodstuffs, that very little if any decline can be expected until another harvest at least.

With this situation confronting us shall we assume the attitude of holding our money awaiting a considerable decline in prices of labor and material, or shall we proceed to carry on a moderate amount of work with the idea of giving relief to our citizens, both through the improvement of the roads and the employment of those released from war work?

Personally, I am of the opinion that the immediate economic value of highway improvement is so great that we can afford to carry on this class of work so long as its cost is not out of line with the cost of labor and commodities at the time the work is done. While the cost of improving the roads may have increased from 60% to 75%, the value of the commodities being hauled over the roads has in many instances increased over 100%. The farmer can afford to give the same number of bushels of wheat for the improvement of roads over which to market his crops when wheat is worth \$2 per bushel as he could when wheat was worth \$1 per bushel. Likewise, the owner of an automobile or motor truck can afford to pay a higher price now for a 365-day road when gasoline and tires, and repairs, are high than he could a few years ago when these automobile essentials were much lower. The fact is that the cost of roads today, measured not by dollars but by the things we produce on our farms and in our factories, and the selling price of labor, is no greater today than it was three years ago.

Again, from the standpoint of assisting in the employment of labor during this crisis it is undoubtedly the duty of the

(Concluded on page 252)

*Paper presented at the fourth annual meeting of the American Association of State Highway Officials, Chicago, Ill., Dec. 9-11, 1918.

†Superintendent of Highways, Department of Public Works and Buildings, Illinois.

GOOD ROADS

CONSTRUCTION TRANSPORTATION MAINTENANCE

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E. L. POWERS
Editor

T. A. HULBERT
Managing Editor

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26

WHY WE SHOULD BUILD ROADS NOW

The economic value of good roads is better appreciated now than it was a few years ago, and is being more generally realized every day.

There is at present little, if any, lack of funds for carrying on the work. Unspent appropriations from previous years are available in many places, and new funds from taxes, bond issues and automobile fees are constantly coming in.

Labor will probably be more easily obtained next season than it has been in the two seasons past, and there seems to be no probability of a shortage of materials. Better transportation facilities, also, can probably be expected.

If there are still opponents of a resumption of road building on a generous scale there remains to them only the argument of the present high cost of doing the work.

The fallacy of that position is well shown in the paper by S. E. Bradt, Superintendent of Highways of Illinois, which is printed on other pages of this issue. He says, in part:

"While the cost of improving the roads may have increased from 60 to 75%, the value of the commodities being hauled over the roads has in many instances increased over 100%. The farmer can afford to give the same number of bushels of wheat for the improvement of roads over which to market his crops when wheat is worth \$2 per bushel as he could when wheat was worth \$1 per bushel. Likewise, the owner of an automobile or motor truck can afford to pay a higher price now for a 365-day road when gasoline and tires, and repairs, are high than he could a few years ago when these automobile essentials were much lower. The fact is that the cost of roads today, measured not by dollars but by the things we produce on our farms and in our factories, and the selling price of labor, is no greater today than it was three years ago."

The truth that Mr. Bradt so clearly states is not a new one, but it is one that must be reiterated until it is brought home to those who foot the bills for road betterment. Men are prone to measure everything by the dollar—at best a deceptive unit of measure. To say that a road costs \$10,000 a mile or \$20,000 a mile means nothing; the \$20,000 road might be the cheaper. The cost of roads, like the cost of

everything else, must be measured in terms of materials, labor, or the intangible but no less real benefits accruing from adequate facilities for transportation and communication.

"GOOD ROADS" IN NINETEEN-NINETEEN

For more than a quarter of a century "Good Roads" has labored in season and out of season for the betterment of the country's highways. During all that time it has consistently advocated what it believed to be for the public interest, avoiding fads, the sensational or visionary and the impracticable. Its aim has been to help to the utmost of its ability in the work of building more roads, building better roads, and maintaining at their maximum efficiency the roads already provided.

In 1919 and the years to come there will be no slackening of effort toward this end. The United States needs more roads and needs roads more now than ever in the past. And though at present they cost more than they did before the war, they are worth more. The value of a highway is not to be measured by the cost of its construction and subsequent maintenance, but by the service it renders—by the saving in hauling costs, in labor of those engaged in transportation and production, and in the wear and tear on the vehicles that use it.

In the future, there will be a great broadening of the scope of "Good Roads," a broadening that began with the establishment of the "Motor Vehicle Transportation" department—now called the "Highway Transportation" department—in April of this year.

The time has come when road builders and every individual and every interest directly or indirectly concerned with the building or the use of highways must adopt the broader view of the road, must look upon it as a factor in transportation and not as an end in itself. Possession of this viewpoint will inevitably bring a modification of our ideas on the methods of administering, financing, constructing and maintaining roads and on the regulation of traffic. If road builders are to succeed in their chosen work, they must build and maintain roads not for the satisfaction of producing good roads and keeping them good, but to so accommodate traffic as to permit the development of highway transportation to its maximum of efficiency and economy.

In order to best serve its field "Good Roads" will take into account these conditions—will, in short look to the interests of road users as well as road builders, for the builders and the users are joint workers in the production of transportation just as truly as the maintenance of way and the operating forces of a railroad are interdependent parts of an organization for producing transportation.

In preparation for this, comprehensive plans for next year are being completed. These include the presentation of special articles by authorities on haulage and the various problems incident to it, as well as on the problems of construction and maintenance that have formed its chief contents in the past and will continue to be fully covered in the future.

In addition "Good Roads" will bend every effort to reporting to its readers the happenings in its field. Present indications are that 1919 will be a year of great progress in road betterment, and that much of interest to the workers in that great field will have to be noted. Large construction programs have been adopted in many states, and there is a strong probability of greater Government participation in road work. New laws will also be enacted in many states.

"Good Roads" will serve its readers with the same striving for accuracy and timeliness that it has maintained in the past, but will broaden the service by the inclusion of the whole subject of highway transportation.

Preparing for After We Have Won the War

(Concluded from page 250)

state to do what it can to tide over this period of uncertainty and unrest. This problem of the unemployed is not alone the problem of the United States. It is the problem of every country that has been involved in the world-wide war. Right Hon. Arthur Henderson, Member of Parliament, says: "Many urgently needed public works will have to be taken instantly in hand by the Government, such as the building of houses, the making and improving of roads, railroads, canals and the reclamation of land." Prof. Harold C. Moulton, of the United States War Labor Policies Board, says that all public and semi-public works which have been held by the war, or for which a need has become apparent since the war began, should be pushed now with the greatest possible speed to reduce unemployment to the minimum. He refers especially to the improvement of roads by state governments and to the resumption of street and public utility improvements by municipalities. President Wilson, in a recent letter addressed to Secretary of Agriculture Houston, urges that the Government resume in full measure the highway construction operations under the Federal Aid Road Act and to do so as speedily as possible; further, that additional appropriations be made available in order that this work may be extended. It would then be in the line of our duty as highway officials to make all preparation possible for the early resumption of highway improvement. Our suggestion, however, would be that contracts be limited to the amount of work that can be completed within the season—with a clause providing for cancellation of contract at the option of the state if the work is not completed within the time specified.

Undoubtedly Illinois has made the greatest financial preparation of any of the states for the after the war highway work. The fiftieth General Assembly, which convened in January, 1917, passed a law providing for a referendum upon the question of issuing \$60,000,000 in bonds for the improvement of a state-wide system of highways. This measure became a law in June, 1917, after the United States had entered into this world-wide conflict. It was generally conceded, both in and out of the Legislature, that if the war was still on at election time its approval by the people was doubtful. Within a short time after the adjournment of the Legislature, Governor Lowden made public a statement to the effect that if the bond issue was passed by the people no bonds would be sold or construction begun until after the war. With this statement he forecast the probable situation at the close of the war, namely, a surplus of labor and a shortage of work, and urged the people to vote the bonds in order that Illinois might be prepared to do her part in giving employment to the returning soldiers and to civilians thrown out of work by reason of the closing of war industries. This phase of the question appealed to the people and was no doubt responsible for a goodly part of the large majority of votes given the bond issue at the election.

I have seen no estimate made by any competent authority as to the duration of the readjustment period and I shall not hazard a guess myself. However, I believe there is still time for other states to make financial preparation and still be able to assist in this readjustment work.

From answers received to inquiries sent to all state highway departments, it appears that there will be available for highway work during the ensuing two years approximately \$700,000,000, involving the employment of approximately 400,000 men each year for the working season, estimated at 180 days. Undoubtedly the amount available and included in this sum will be materially increased by many of the states.

In connection with preparation for highway work we would urge return to normal conditions through the release of control of highway bond issues by the Capital Issues Committee. It is apparent that if the proceeds of these bonds are to be made available at an early date to assist in preventing unemployment, the various political units which are entitled to issue them should be permitted to proceed without further delay. I believe this to be a proper matter to receive the attention of this association.

There is another condition brought about by the war which has added materially to the cost of roads, viz., the matter of freight rates. Prior to the time of utilities commissions and the Interstate Commerce Commission many states were given concessions in freight rates on road building material. These have not only been annulled, but the rates on this material have been increased, in some instances out of proportion to advances on other commodities. I believe that some relief should be obtained, especially during this emergency.

Still another line in which preparation should be made is in the matter of engineers. More than two-thirds of the Illinois force are now engaged in Government service. The colleges cannot supply the demand. It is, therefore, desirable that some concerted action be taken with a view to having these men now in Government service released as rapidly as possible to make preparation for home enterprises.

Our greatest railway development in the United States, covering a period of about twelve years, followed closely the end of the Civil war. This was brought about to some extent at least through the settlement upon the lands of many of the returned soldiers. The soldiers who have been in France and Belgium and Italy and have seen the government roads of those countries, reaching to the smallest hamlets, will not be satisfied with conditions in our agricultural sections until we, too, have a system of roads fairly comparable to those on the continent. If we expect those boys to return to the farms from which they came, or to go to farms in new sections, we must prepare the way by a system of roads that will connect them not only with their adjacent communities but with the country as a whole.

Philadelphia Snow Removal Contracts

Department of Public Works Secures Unit Prices Lower Than Those of Last Winter

Contracts for loading, hauling and disposing of snow during the winter throughout a section of Philadelphia, Pa., have recently been awarded by the Department of Public Works of that city. The area covered is that between South and Vine Sts., and between Broad St. and the Delaware River, except on Chestnut, Market and Walnut Sts., which are to be cleared between the two rivers.

The cost of removing 40 in. of snow last winter was \$119,000, while the cost during the preceding winter was \$86,000 for 24 in. Awards for the present winter with the prices per cubic yard for this winter and for the winter of 1917-18 are shown in the subjoined table.

District Number	Contractor	Price, cents	
		1917-18	1918-19
1.....	Union Paving Co.....	60	52
2.....	Cunningham Bros., Inc.....	65	48
3.....	E. L. Bader.....	58	48
4.....	E. D. Kelly & Sons.....	56	54
5.....	Cunningham & Murray.....	61	55
6.....	J. F. Nolan.....	65	65
7.....	Cunningham Bros., Inc.....	62	53
8.....	William Boshier.....	57	63
9.....	L. Solomon.....	65	66
10.....	Edward Graham.....	65	45
11.....	Thomas L. Flanagan.....	65	49
12.....	E. L. Bader.....	59	48
13.....	James Irvin.....	54	49
14.....	John Devlin, Jr.....	54	47
15.....	James Irvin.....	65	49

Horsemen Oppose Snow Removal

New York State Association of Horsemen Goes on Record as Opposing Proposal to Keep Trunk Lines Open for Motor Truck Traffic

The New York Association of Horsemen has issued to the horse users of the state a letter urging active opposition to the proposed plan of keeping open the main highways for motor truck traffic during the winter.

According to the association, the use of roads by horse owners is jeopardized by the proposed action. It is claimed that horses cannot stand on the slippery roads if the snow is cleared off, and that the same condition will result if the snow is removed to within a few inches of the surface. A local grange recently adopted a resolution opposing the cleaning of snow from roads, and other horse organizations are urged by the association to follow its lead.

Motor Vehicle Law for New York

Material Changes in Present Law and the Establishment of a State Motor Vehicle Department Proposed

Material changes in the motor vehicle law of New York State and the establishment of a separate state department to have control of motor vehicles were discussed at a recent meeting in New York.

The meeting was called by Col. E. S. Cornell of the National Highways Protective Society, and was attended by Motor Vehicle Commissioners W. L. Dill of New Jersey; R. B. Stoeckel of Connecticut and E. A. Baughman of Maryland; Chairman W. D. Sohler of the Massachusetts Highway Commission; Magistrate F. B. House of the Manhattan Traffic Court, New York, N. Y.; E. J. McGoldrick, Assistant Corporation Counsel for the City of New York at Albany, and Capt. Dutton of the New York State Constabulary.

Among the provisions of the proposed law are that the state board shall have control over motor vehicles; that every applicant for a license shall pass a practical test and a written examination; that every licensed operator shall wear a badge on the left wrist while driving, and that driving without a license shall be a serious criminal offense, punishable by a heavy fine.

Limestone and Sandstone for Highway Work

Geological Survey Compiles Data on Production and Sale in the United States in 1917

The amount of limestone sold for paving, curbing and flagging forms an almost negligible portion of the total output in the United States, according to statistics compiled by the U. S. Geological Survey, and there was a decrease in the amount used for each of these purposes in 1917 as compared with 1916.

In 1917, there were produced 138,720 paving blocks of limestone, equivalent to 1,400 short tons. The corresponding figures for 1916 were 300,000 and 3,100. The value of the 1917 output was \$7,273 as compared with \$14,237 in 1916. The 1917 production of limestone curbing was 118,937 lin. ft., or 6,600 tons, valued at \$51,972. The amount produced in 1916 was 190,229 lin. ft., 10,600 tons, valued at \$79,338. In 1917 the production of flagging was 63,130 sq. ft., 1,700 tons, having a value of \$8,327. In 1916 the corresponding figures were 70,000 sq. ft., 2,000 tons, and \$10,411.

The amount of crushed limestone sold for road metal in 1917 was 9,273,282 short tons, valued at \$6,420,257. In 1916 the sales amounted to 13,245,634 tons, valued at \$7,416,984.

Sandstone sold for road purposes in 1917 also showed a decrease as compared with that sold for similar purposes

in 1916. The sale of sandstone paving blocks in 1917 amounted to a total of 7,093,500, equivalent to 70,940 short tons, and valued at \$352,808. In 1916, the sales were 7,300,000 blocks, 73,000 tons, valued at \$327,264. This is an increase in value of 7.8% in 1917, but a decrease of 2.8% in quantity. The blocks were produced in 7 states in 1917 and in 13 in 1916.

Sandstone curbing sold in 1917 amounted to 2,177,560 lin. ft., or 112,300 short tons, valued at \$651,564, while in 1916 the sales were 2,417,000 lin. ft., 124,470 tons, valued at \$702,902. The sale in 1917 showed a decrease in value of 7% as compared with those in 1916, and the 1916 sales, in turn, showed a decrease of 22% as compared with the previous year.

Sandstone flagging sales in 1917 were 2,963,980 sq. ft., or 71,630 tons, valued at \$348,000. The corresponding figures for 1916 were 3,050,000 sq. ft., or 75,000 tons, valued at \$389,859. The value in 1917 as compared with 1916 showed a decrease of 11%.

Crushed sandstone sold for road metal in 1917 amounted to 450,478 short tons, valued at \$398,695, a decrease of 45% in quantity and 36% in value.

Road Program for Oklahoma

Governor-Elect Robertson to Propose Comprehensive Plan in Message to the General Assembly in January

An ambitious road improvement plan, involving a total expenditure of from \$25,000,000 to \$30,000,000 raised by a bond issue, is to be proposed by Governor-Elect Robertson of Oklahoma, in his first message to the Legislature, according to recent advices.

It is proposed to finance the work by means of a bond issue similar to that recently voted in Illinois. The payment of the principal and interest will be met from automobile license fees, from that portion of the production tax on oil which goes to the road fund, and from other existing sources. Governor-Elect Robertson believes that this will be sufficient without the levying of an additional tax.

It is understood that the construction of hard-surfaced roads crossing each county in the state, east and west, and north and south, is included in the proposed plan.

Work on the Memphis to Bristol Highway in Tennessee is to be commenced shortly, according to recent reports from Knoxville. The work is to be done with federal aid.

The Oregon State Highway Commission has been advised by the Capital Issues Committee that it will approve bond issues for necessary work where materials are available. This decision will affect practically all road work contemplated in Oregon, according to the state highway officials.

The Utah State Highway Commission is planning extensive work for next season, according to recent reports from that state. The moving of large crops and the giving of employment to a large number of men are the two factors chiefly responsible for the extent of the proposed program, it is said.

Surveys for the Proposed Bridge over Chesapeake Bay near Baltimore, Md., have been started under the direction of Chief Engineer Mackall of the Maryland State Roads Commission. The structure is to connect the agricultural and fruit growing sections on the Eastern Shore with Baltimore and the remainder of the state. The estimated cost of the bridge is from \$10,000,000 to \$12,000,000. It is planned to build the bridge of concrete and to have it carry railroad and highway traffic.

Massachusetts Highway Association

OFFICERS FOR 1917-18

JOHN M. KEYES, President.....Concord
JOHN M. MCCARTHY, Secretary.....15 Ashburton Place, Boston
CHARLES A. BROWN, Treasurer.....Wellesley

Vice Presidents

ALBERT H. RHODES.....Worcester
WILLIAM J. GANNON.....Fitchburg

Directors

CHARLES J. BENNETT.....Hartford, Conn.
RICHARD A. JONES.....Waltham
HENRY A. SPATES.....Winchester
JOHN A. GAFFEY.....Medford

Announcement

This section of the paper is open to members of the Massachusetts Highway Association for the discussion of matters directly connected with road interests. Members are requested to submit items of interest for use in this column.

Address all communications to GOOD ROADS, P. O. Box 2705, Boston.

The 25th anniversary meeting of the Massachusetts Highway Association was held at the American House in Boston on Thursday evening, Dec. 19, beginning at 6 o'clock.

There were about 200 members present, and the entertainment that preceded and ended the meeting was a credit to the entertainment committee which consisted principally of Mr. Williams, who acted as master of ceremonies.

President Keyes called the meeting to order and asked Mr. Michael Driscoll to act as toastmaster. Mr. Driscoll requested all of the charter members present to rise as their names were called and as each one arose he was greeted with hearty applause. Of the original members there were present Messrs. Driscoll, McClintock, Smith, Brown, Stuart and Allen. They favored the members with short reminiscences of the old days and all expressed a hope that the association would continue to prosper for the next 25 years. Mr. McClintock insisted that he was not ready to be oslerized even at seventy.

Prof. Allen referred to his organization of the first course in road building to be established in the United States. Mr. Stuart expressed surprise at the small number remaining out of the original membership and called attention to the great service to good roads performed by Mr. McClintock in his classes at Harvard and during his long service as Massachusetts State Highway Commissioner.

Mr. Driscoll gave an interesting account of the first meeting of the Association on March 2, 1893.

In answer to a communication sent to the different superintendents of streets throughout the State of Massachusetts by Mr. Wm. E. McClintock for the purpose of effecting an organization the following gentlemen responded: Wm. E. McClintock, Massachusetts Highway Commission; Charles R. Cutter, Deputy Street Commissioner, Boston; Henry Manley, City Engineer's Department, Boston; Wm. H. H. Ryder, Marion; Michael Driscoll, Superintendent of Streets, Brookline; Henry A. Childs, Superintendent of Streets, Wellesley; Thomas B. Moseley, Superintendent of Streets, Westfield; Alonzo H. Kimball, Super-

highways, Hingham; W. W. Ewell, Quincy; Superintendent of Streets, Arlington; Superintendent of Streets, Waltham; Superintendent of Streets, Belmont; Superintendent of Streets, Hyde Park; John B. Prichard, Superintendent of Streets, Medford; Samuel S. Merrill, Superin-

tendent of Streets, Salem; John O'Gara, Spencer; Charles W. Ross, Superintendent of Streets, Newton; Philip Putnam, Superintendent of Streets, Dedham; Wm. A. Black, Superintendent of Streets, Taunton; Loren B. Walker, Superintendent of Streets, Clinton; Charles H. Black, Chelsea; Lucian B. Stone, Superintendent of Streets, Worcester; Z. P. Jordan, Superintendent of Streets, Holbrook; Harold Parker, Lancaster; Albert F. Noyes, City Engineer, Newton.

At 3 p. m., after Mr. McClintock had given an explanation of why the meeting was called, and said that its purpose was the formation of a society to bring the superintendents of streets of the different cities and towns in Massachusetts together in the form of an organization, on motion of Charles R. Cutter, it was voted that for the purpose of transacting business Wm. E. McClintock act as temporary chairman. On the motion of Charles H. Black it was voted that Charles R. Cutter be elected temporary secretary.

A general discussion then took place of the aims and objects of the organization, after which, on motion of Charles H. Black of Chelsea, it was voted that the temporary organization be made permanent, said permanent organization to consist of a president, two vice presidents, secretary and treasurer.

On motion of Charles H. Black, of Chelsea, with Charles R. Cutter of Boston in the chair, William E. McClintock was unanimously elected president.

The organization then proceeded to business and the following officers were elected: Lucian B. Stone, Worcester, and Wm. L. Dickinson, Springfield, Vice Presidents; Charles R. Cutter Boston, Secretary; Samuel S. Merrill, Salem, Treasurer.

On the motion of Michael Driscoll of Brookline it was voted unanimously that the organization be known as the Massachusetts Highway Association.

On the motion of C. H. Black it was voted that the president, vice presidents, secretary and treasurer report at the next meeting a constitution and by-laws for the governing of the organization.

On the motion of Harold Parker of Lancaster it was voted that this committee report within three weeks.

After a general discussion of plans, etc., the meeting adjourned subject to the call of the chairman.

Charles R. Cutter,
Secretary.

Boston, March 22, 1893.

The Massachusetts Highway Association met today at 11.30 a. m., at the Quincy House, Boston, President Wm. E. McClintock in the chair, and 36 members present: Wm. E. McClintock, Chelsea; Charles R. Cutter, Boston; Wm. L. Dickinson, Springfield; Samuel S. Merrill, Salem; Henry H. Carter, Boston; Robert E. Crowley, Lowell; Loren B. Walker, Clinton; Henry B. Wood, Boston; F. H. Eames, Somerville; Charles H. Pratt, Winchester; Wm. T. Pierce, Watertown; Sidney Smith, Boston; C. Frank Allen, M. I. T.; Thos. H. Randall, Beverly; Jas. Merridew, Rockport; Geo. E. Tolman, Waltham; Chas. L. Berry, West Newton; A. B. Drake, New Bedford; Anthony Thurston, Fall River; Geo. E. Stuart, Newton; Chas. A. Peck, Newton Center; Wm. J. Luther, Attleboro; E. H. Reed, Cambridge; Richard A. Jones, Waltham; Charles H. Black, Chelsea; Wm. W. Elwell, Quincy; John O'Gara, Spencer; Charles W. Ross, Newton; Albert F. Noyes, Newton; Michael Driscoll, Brookline; Charles A. Wentworth, Hyde Park; J. T. Lovejoy, Andover; Henry A. Childs, Wellesley; S. E. Mandell, Rochester; Wm.

H. H. Ryder, Marion; James Forrest, Stoneham; Philip Putnam, Dedham; D. H. Sherman, Lincoln; Leroy F. Nevons, Milton; George W. Stiles, Malden; Z. P. Jordan, Holbrook; James H. O'Brien, Avon; H. M. Stowers, Franklin; George Kimball, Danvers; Arthur J. Wellington, Boston; John P. Prichard, Medford; Frank D. Chant, Belmont; E. A. W. Hammett, Boston; E. B. Eames, Somerville.

The secretary read the minutes of the preceding meeting which were approved.

The committee on constitution and by-laws reported and its report, after a short discussion, was accepted and ordered to be printed.

The association then voted to instruct the board of government to procure a charter of incorporation from the State of Massachusetts, according to the constitution of this association.

The president then announced that according to the constitution of the association it would be necessary at the present time to elect four directors, two for two years and two for one year.

The president appointed Messrs. Prichard of Medford, O'Gara of Spencer and Crowley of Lowell a committee to present four names for the office of directors and later, on their report, recommended as directors for two years, Henry H. Carter of Boston and Loren B. Walker of Clinton; directors for one year, Robert E. Crowley of Lowell and Albert B. Drake of New Bedford.

The report of the committee was accepted and on ballot Messrs. Carter, Walker, Crowley and Drake were unanimously elected.

The secretary was then instructed to have at the next meeting the constitution and by-laws in such condition that all those who wished might become members by signing the said constitution and by-laws, and that after that meeting it would be necessary for any person wishing to join to be proposed and elected in the regular manner.

This completed the organization of the association, and the said association was ready for business in forwarding the objects for which it was formed.

After a short address by the president, the association adjourned for the purpose of partaking of its first banquet.

After the said banquet had been disposed of and the cigars lighted, short addresses on the subject of good roads and their experience in constructing and maintaining them were given by following members: Wm. E. McClintock, Massachusetts Highway Commissioner; Loren B. Walker, Superintendent of Streets, Clinton; E. H. Reed, Superintendent of Streets, Cambridge; W. W. Ewell, Superintendent of Streets, Quincy; Charles W. Ross, Superintendent of Streets, Newton; Michael Driscoll, Superintendent of Streets, Brookline; John P. Prichard, Superintendent of Streets, Medford; Frank D. Chant, Superintendent of Streets, Belmont.

At 5 o'clock the president adjourned the meeting until the next regular meeting, Tuesday, May 9, 1893.

Charles R. Cutter,
Secretary.

After Mr. Driscoll's interesting account of the first meetings, he called on a number of members and several responded. Mr. Macksey spoke for the returned soldier and hoped that he would be given a good place, a better one than he had left behind when he went away, and a chance to share in the prosperity of the nation.

Mr. Learned of Framingham announced that he was an amateur contractor and that he had been trying, and he hoped successfully, to build substantial roads to satisfy the Massachusetts Highway Commission. He hoped that the cities and towns would make up for the lost time in road building and make generous appropriations for highway work.

Mr. Henry N. Teague, Associate Chief, Information and Education Service, Department of Labor, was introduced and read a message from the Secretary of Labor, a part of which we quote below:

"I am not one of those who take the ground that a country or a government owes every man a living. But all governments, all organized society is man-created, and consequently, more or less artificial because of the restrictions that must of necessity be imposed for the purpose of enabling us to live in harmony with each other. And because of those restrictions, men have not always the opportunity to earn a living."

Several other members spoke and those who remained after the speaking were entertained until a late hour by the artists selected by Mr. Williams.

We offer congratulations to the newly elected mayor of Springfield, the Hon. Arthur A. Adams, a past president and honored member of the M. H. A. Only twice in recent years has any mayor of Springfield been elected by a larger plurality. The deciding vote was 6,097 against 3,670, giving him a lead of 2,427 votes.

His campaign was conducted in a dignified and self-respecting manner and the Democrats uttered no derogatory word against him, although he had for a long time held a position in local public life that was considered a fair object for attack, the superintendency of streets. The value of his service to the community in this capacity—a service that he relinquished of his own volition—is fully recognized by all who are familiar with it. The circumstances surrounding his election augur for future pleasant conditions and give him a fair start unhampered by any bitterness.

That Mr. Adams will conduct himself in the mayor's chair in a manner reflecting credit on himself and on the municipality is the honest belief of all who know the man. That he will handle the great problems which are before him with highly distinctive ability is just as confidently believed. His many years in the office of superintendent of streets have made him familiar with some of the city's most important problems, from various angles. His technical knowledge along certain lines will be of value to the city, while his general business ability and his executive capacity, manifested both while in the service of the city and his own private business, cannot but work to the advantage of the municipality while he is in the mayor's chair. All in all, the city has reason to consider itself fortunate that Mr. Adams was found willing to assume the responsibilities that are now before him, and we feel sure that in his new work he has the good wishes of every member of the Massachusetts Highway Association.

The repeated disclosures of deficiencies and financial wrongdoing of Massachusetts town officers who have to do with the handling of the town funds indicate that there is something radically wrong not only with the offending officials, but also with the system now in force. Not long ago a shortage of some \$25,000 was reported from Whitman. During last summer the Bureau of Statistics found \$80,000 to be missing from the town of Canton. A Stoneham official is now under indictment in the matter of the disappearance of \$18,000 and within a day or two it was reported from Hingham that some town money amounting to \$9,000 was involved in unexplained transactions.

Is not the cost of municipal government high enough already without the taxpayers being subjected further to the heavy burdens of such maladministration as these unfortunate occurrences imply, and is it not about time we had some legislation which will correct the situation?

About eight or nine years ago, when the town treasurer

(Continued on page 257)

New York State Road Builders' Association

OFFICERS

JOHN H. GORDON, President.....Albany
C. J. HENDRICKSON, Vice President.....Syracuse
WILLIAM G. FOX, Treasurer.....Saratoga

Trustees

W. A. GREENFIELD.....Hornell
T. H. GILL.....Boston, Mass.
FRED E. ELLIS.....Melrose, Mass.
W. T. THAYER.....Chateaugay
JOSEPH WALKER.....Albany
S. B. VAN WAGENEN.....Rondout

Legislative Committee

FRANK G. FOWLER, Chairman.....Mt. Kisco
JOHN B. DOWER.....Ballston Spa
H. B. HARRISON.....Buffalo
W. T. THAYER.....Chateaugay
N. E. YOUNG.....Binghamton

Membership Committee

RICHARD HOPKINS, Chairman.....Troy
FRED E. ELLIS.....Melrose, Mass.
C. A. GREENFIELD.....Hornell
C. J. HENDRICKSON.....Syracuse
J. F. PADDELFORD.....Sherburne

A full-sized boom for John H. Gordon, of Albany, N. Y., to succeed Edwin Duffey as Highway Commissioner for New York State is well under way. Mr. Gordon's 15 years' experience in road building and his position as president of the New York State Road Builders' Association for four years speak for themselves. The position requires a man expert in highway work, with executive ability of a very high order, and a number of other qualifications not generally possessed by a mere politician.

Road builders are looking forward to the years 1919 and 1920 as being busy ones for them. This is expected in view of the fact that during the past two seasons, work has been practically suspended on account of war conditions. Furthermore, it is pointed out that under a constitutional amendment approved by the voters last election day, it will be possible to connect all state highways, making a complete chain of them from one end of the state to the other. There are literally hundreds of such connecting links to be constructed with state and federal money.

County Highway No. 130, Erie County, N. Y., sometimes called the Buffalo Main Street Extension, is a main traveled road northeast of Buffalo, and was built in the year 1914 under the supervision of the Buffalo Division of the New York State Highway Commission. Wm. Acheson was division engineer. Since the war, and particularly during the past two years, this road has been used constantly by army motor truck fleets from points further west to the seaboard. It also carries heavy miscellaneous truck traffic, not to mention a large volume of passenger traffic. At the present time the road fails to show any effects of this heavy traffic and is apparently in as good condition as when finished by the New York State Highway Commission.

Claims filed against the state with the Court of Claims by Highway contractors, for increased construction expenses in highway work due to the passage of the Workmen's Compensation Law, aggregate more than \$40,000. The claims are filed in accordance with an act of the last Legislature which permitted such filing of claims for additional expenses for highway construction work made necessary by the passage of this law. Among the contractors to take advantage of the act are: Jas. Anderson, Albany County, \$607.19; Sproul Construction Co., Broome County, \$3,326; Parker-Hassam Paving Co., Hamilton County, \$2,957.60; John H. Gordon, Schoharie County, \$1,400; Russo-Parker Construction Co.,

\$1,300; Wm. G. Fox, Saratoga County, \$5,092.03; Cooper-Snell Co., Edw. J. Anderson, G. Edw. Laing and the St. Lawrence Construction Co.

The superintendent of highways in the town of Guiderland, Albany County, will obtain his salary monthly instead of annually, as has been the custom heretofore. The town has been authorized to raise \$1,000 toward a fund, out of which the town official will be paid monthly.

Approximately \$3,600,000 was paid last week as the state's share of the interest on the canal and highway funded debt, aggregating at present \$228,000,660. These payments represent the interest for the past 6 months, accruing Jan. 1, upon the obligations incurred, by the vote of the people, during the last 12 years.

Road builders hope to have a bill passed in the next Legislature similar to the one put through by Senator Walters for the relief of canal contractors. They expect reimbursement from the state for losses occasioned by war conditions, abnormal prices of everything used in construction work and the scarcity of labor.

Albany is located on one of the three highway systems which the United States Government will keep free of snow during the coming winter. The first snow has already fallen in some far northern states, and it will not be very long before the white flakes will be falling and covering fields, and filling streets and highways.

F. P. Williams of Rochester, N. Y., has been named as special deputy state engineer, to succeed Dwight B. La Du of Whitehall, who resigned to become democratic candidate for state engineer. Mr. Williams' appointment was approved at a meeting of the Canal Board. He has been division engineer since 1914 in charge of barge canal construction between Rochester and Buffalo. Mr. Williams is a native of Olean and a graduate of Cornell University.

Walter L. Lawson, a road contractor of Glens Falls, N. Y., was sued by Charles Armstrong, a farmer residing in the town of Knox, County of Albany, for damages to his barn caused by a steam roller owned by Mr. Lawson emitting sparks and setting fire to the Armstrong barn. The damages were placed at \$10,000. The counsel for both parties agreed that the judge should fix the amount for the jury to decide upon, and he decided that a \$1,500 verdict be returned, which was done.

With the aid of the United States Weather Bureau at Washington, Chief Meteorologist Geo. T. Todd, of the Albany branch, Peter G. Ten Eyck, Regional Chairman of the Highways Transport Committee, National Council of Defense, and state and county highway departments, it is expected that reports will be made on road conditions and sudden changes in the weather along the main highway between Albany and New York, and between Albany and Buffalo. State and county officials and automobile clubs who make this route, are expected to make prompt reports on road and climatic changes so that users of the highway may be kept informed as to conditions and forecasts.

New Hampshire Good Roads Association

OFFICERS FOR 1918

CHARLES A. FRENCH, President.....Laconia
 F. E. EVERETT, First Vice President.....Concord
 W. M. CHAPLIN, Second Vice President.....Keene
 GEORGE P. WINN, Secretary and Treasurer.....Nashua

Board of Directors

O. F. WINSLOW.....Nashua
 C. M. BROOKS.....Keene
 H. L. SMITH.....Lakeport
 ALFRED CLARK.....Concord

A meeting of the New Hampshire Good Roads Association was held in the Assembly Hall, City Hall, Nashua on Dec. 19, 50 members being present. F. E. Everett, State Highway Commissioner, called the meeting to order, and records of the previous meeting were read. W. B. Howe, of Concord, was selected to be secretary of the association for the balance of the year, and three new members were elected—J. Randolph Coolidge, Jr., of Brookline, Mass., D. A. Kennedy, of the John Baker, Jr., Co., and W. C. H. Stevenson of the American Tar-Co. Mr. Clark, of Concord, moved that the next meeting be held in Concord, and his motion was carried.

After transacting the regular business, the meeting was adjourned until 12:30 when dinner was served. Later Mr. Everett introduced Mayor Crowley of Nashua, who spoke on road conditions in Nashua and New Hampshire.

J. Randolph Coolidge, Jr., Regional Chairman of the Highways Transport Committee, spoke on the activities of his department and urged the necessity for cooperation in the matter of return loads on long distance hauls. The speaker also suggested the advisability of passing new laws to cover the use of motor trucks, and recommended that there be limits placed on weight of load, width of tires and speed, the total weight on the road not to exceed 12 tons and no trailers to be allowed. He also proposed that one-half the burden of expense for the maintenance of roads be placed on the truck owners and the balance on the general public.

Mr. Everett gave a short account of his visit to the recent meeting of the American Association of State Highway Officials and then introduced O. F. Winslow, who also attended the Chicago meeting. C. E. Price, representing the Portland Cement Association, showed some interesting moving pictures of road construction that were prepared for use in Illinois to promote a bond issue for highway construction.

New Hampshire has had several snow squalls. The heaviest came on Dec. 6 when about 10 in. of snow fell.

State Highway Commissioner F. E. Everett has been able to resume his duties after a slight attack of the grippe.

The State of New Hampshire was well represented at the Highways Industries Association meeting held in Chicago, Ill., Dec. 11-13, by F. E. Everett, State Highway Commissioner and O. F. Winslow, of Nashua.

Federal aid project No. 12 in the town of Londonderry is under construction. The finished surface of the road will be gravel.

The state intends to extend the concrete road in Hooksett during the season of 1919.

There are several projects planned for completion during next year that will eliminate several bad curves and

grades on the Merrimac Valley Trunk Line between Nashua and Laconia. Preliminary surveys have already been completed and plans made for an early start on the work.

Thomas & Murphy have completed contracts on federal aid projects No. 12 and No. 17 in the towns of Hampton, Hampton Falls and Seabrook, a total length of 5 mi., with a surface of mixed asphalt.

The citizens of Berlin, N. H., have decided by a vote of 933 to 566 not to change the name of the city, notwithstanding complaints that its sound was unpleasant to American ears. The name proposed was Maynesboro, by which the town was known before it was incorporated as a city.

The New Hampshire Goods Roads Association postponed its annual meeting twice so as not to conflict with other road meetings and then set the date for the same day as the Massachusetts Highway Association's Silver Jubilee.

The City of Concord reports that on account of the weather they have had to cease all operation in highway work and start their regular winter routine.

Massachusetts Highway Association Notes

(Continued from page 255)

of Framingham went wrong in the amount of several hundred dollars because of certain irregularities in the issue of town notes, the Legislature promptly passed an act requiring all such securities to be issued thereafter on uniform forms devised by the director of the Bureau of Statistics and to be rectified by him, and since then we have had no similar scandals, and it has now become practically impossible for towns to issue notes of any kind over forged signatures or contrary to law. But other loopholes for financial loss through loose accounting methods were left open. The disclosures of shortages in town accounts in recent years have been chiefly due to examinations made by agents of the Bureau of Statistics under a statute which only gave the director of that bureau permission to cause an audit to be made of accounts and to install effective accounting systems in cities and towns upon their petition and at their own expense. Nearly 100 of our municipalities have voluntarily taken advantage of this legislation, certainly a most gratifying record. But in too many cases, as in those cited above, this action was not taken until too late to avoid disaster.

The next Legislature ought to give Director Getteny the authority and responsibility to proceed without further delay to do at least for the remaining towns, if not for the cities, of the commonwealth what his office has already done for a little less than one-third of our municipalities and done, we believe on the whole, to their satisfaction and certainly to the great advantage of their taxpayers.

W. H. Sherman, a charter member of the M. H. A., has the unique distinction of being the elder of three generations all engaged in highway work and all members of the association.

W. H. Sherman was for many years superintendent of streets in Lincoln. His son, W. T. Sherman, has also held the same office and the grandson, Raynor G. Coburn, is

now Superintendent of Streets of Weston. We doubt if this record can be matched in the United States.

A number of the members have sons in the service. Mr. H. W. West has just had a letter from his boy, who is in the Navy, saying that he is at present in Kiel and in good health now, although he has earned one wound stripe.

Mr. McCarthy, our invaluable secretary, has had a letter from his son from "somewhere in France" reporting that he is well.

Mr. Keyes' son is still in the ambulance service and is in good health.

Figures from the office of Albert B. Fales, Assistant Tax Commissioner, show that the highest tax rate in Massachusetts is \$43 per \$1,000 in the town of Savoy in Berkshire County. The lowest is \$2.50 in Hopedale, Worcester County. The rate is from \$2.50 to \$9.80 in 11 towns; from \$10 to \$14.60 in 52 towns; from \$15 to \$19.80 in 6 cities and 122 towns; from \$20 to \$24.70 in 26 cities and 107 towns, and from \$25 to \$43 in 6 cities and 28 towns.

The Cambridge city ordinance of June 12, 1917, granting city laborers \$3 per day has been declared invalid by the decision of the full bench of the Supreme Court.

The court dismisses petition for mandamus brought by Andrew Shannon and other employees of the Cambridge Street Department to compel former Mayor Rockwood, the superintendent of streets, and the city auditor to approve and sign payrolls authorizing the treasurer to pay day laborers \$3 per day. The Supreme Court says that the ordinance conflicts with the municipal indebtedness statute of 1913.

MEETINGS

Calendar of Coming Meetings

Jan. 14-16.—Virginia Good Roads Association.—Eighth Annual Convention, Richmond, Va. Secretary, C. B. Scott, Richmond, Va.

Jan. 21-23.—Michigan Engineering Society.—Annual Convention, Flint, Mich. Secretary Wm. W. Cox, 508 West Madison St., Lansing, Mich.

Feb. 25-28.—American Road Builders' Association.—Sixteenth Annual Convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau St., New York, N. Y.

New York State Motor Federation

A meeting of the New York State Motor Federation was held at the Powers Hotel, Rochester, N. Y., on Dec. 13 and 14. Among the speakers were State Highway Commissioner Edwin Duffey, John J. C. McInerney, Counsel of the Federation; A. G. Batchelder, Executive Chairman of the American Automobile Association; George C. Diehl, Chairman of the Good Roads Committee of the American Automobile Association; and Robert M. Searle, Vice President of the Rochester Railway & Light Co.

The resolutions adopted included the federal aid resolutions adopted at the joint meetings of the American Association of State Highway Officials and the Highway Industries Association held at Chicago, Ill., Dec. 9 to 13, inclusive, and printed in "Good Roads" for Dec. 21. Other resolutions favored the resumption of road work despite high prices; the approval of all bond issues for highway construction and

the building of certain roads in New York State. Other resolutions urged that roads be built with more durable materials; that bridges be strengthened; that railroad crossing approaches be widened and warning signs arranged for; that the Public Service Commission provide for better head lights on locomotives in New York, and that the highway department prepare a new road map of the state.

Officers were elected as follows: President Dr. Frederick R. Smith, Rochester; First Vice President, G. R. Schryver, Watertown; Second Vice President, Fred W. Sessions, Utica; Third Vice President, H. D. Knight, Seneca Falls; Treasurer, I. J. Kent, Richfield Springs; Chairman of the Executive Committee, Ransom J. Barrows, Jamestown. At a meeting of the board of directors, following the convention, George C. Donahue, of Rochester, was named secretary and Fred W. Sessions, of Utica, chairman of the legislative committee.

PERSONAL MENTION

B. M. Williams has resigned as city engineer of El Paso, Tex., after serving eight years in the department.

Frank F. Rogers, State Highway Commissioner of Michigan, has been elected secretary of the Association of Mississippi Valley State Highway Departments.

Robert W. Waddell has been appointed city engineer of Kansas City, Mo. Mr. Waddell, who was formerly assistant engineer, has been acting head of the department since early in June.

Thomas L. Willis has been appointed city engineer of New Orleans, La., to succeed the late Capt. W. J. Hardee. Mr. Willis served as first assistant engineer under Capt. Hardee from 1908 to 1914 when he was made superintendent of the municipal asphalt plant, a position which he held until his appointment as city engineer.

S. M. Williams, for the past four years sales manager of the Garford Motor Truck Co., has been placed in charge of the department of highway development that has recently been established by the company. For a number of years Mr. Williams has devoted a great deal of time to the subject of highway improvement. He was chiefly instrumental in the organizing of the Highway Industries Association, to the presidency of which he was re-elected at the Chicago meeting this month.

OBITUARIES

Robert P. Abendroth, Assistant Engineer in the Topographical Bureau, Queens County, New York, died recently at the age of 53.

Alonzo C. Bell, who was for four years city engineer of New Orleans, La., and later assistant engineer of the Dock Board of that city, died recently at the age of 59.

Charles P. Brooks, a consulting engineer of Salt Lake City, Utah, died in that city recently. Mr. Brooks was a graduate of the Sheffield Scientific School, Yale University, and had been connected with the city engineer's office in New Haven, Conn., and in Chicago, Ill. In 1874 he went into private practice with R. H. Brown in Salt Lake City, and has since served as a member of the Salt Lake City Board of Health, county surveyor of Salt Lake County and consulting engineer for the Board of Public Works on the construction of the Salt Lake City sewerage system.

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Good Roads...
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